

Marine Review

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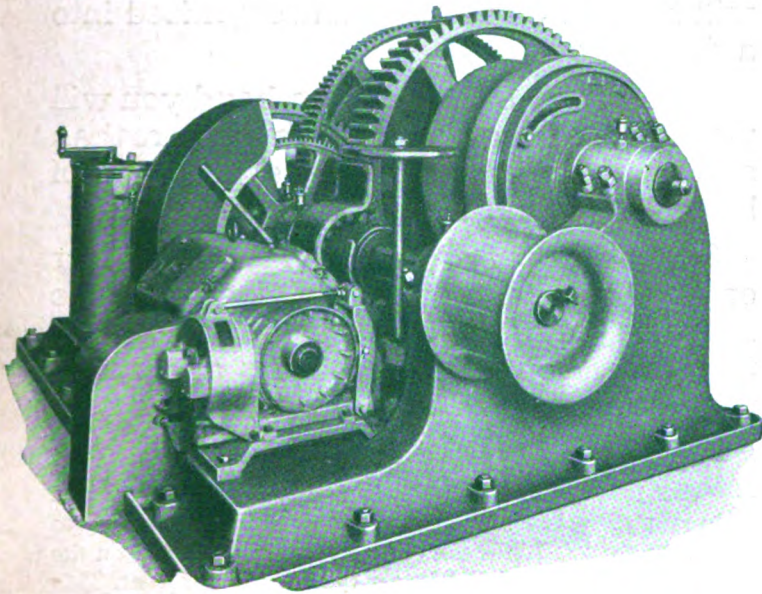
THE BUSINESS OF TRANSPORTATION BY WATER

NEW YORK CLEVELAND LONDON

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ELECTRIC WINDLASS



Electrically - Driven Anchor Windlass, Spur Geared, as Built for Motorship "Henry Ford II".

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Your Guide To this Issue

Congress Meets

WILL congress accept sensible advice on the merchant marine and do something constructive?

See Page 17

Motorship Gripsholm

A 17,000-ton liner crossed the Atlantic in 8½ days and burned less than 65 tons of fuel a day. An illustrated account.

See Pages 18 and 19

Cut Fuel Costs

INTELLIGENT and careful operation on the part of ship's personnel, under proper guidance, reduced fuel costs and greatly improved all around efficiency. Tables and chart show how much.

See Page 22

From Rail to Ship

RAILROADS deliver to and receive vast quantities of freight from ships at the great seaports of the country. How the railroads handle this interchange, with many illustrations, is told in this issue.

See Page 23

Freight Handling

HOW one operator substituted mechanical for manual methods and saved in the cost of freight handling is told with illustrations.

See Page 27

Pulverized Coal

PULVERIZED coal looms large as a possible highly efficient and cheap fuel for marine boilers. Land practice established.

See Page 28

Maybe your welding problem is unique



PERHAPS a new welding method will have to be developed. Possibly the problem will need some engineering thought. It is even conceivable that competent welders will have to be selected and organized into a department.

If you have such a job on hand you will want advice from someone who is more than an expert welder. You can get this kind of help from a Linde Service Supervisor.

Service Supervisors are men of wider experience and broader training than the Service Operators. They act as technical aids to the division sales managers and make their headquarters at the division offices.

NOT LONG AGO a piping contractor had one of those jobs that was going from bad to worse. He was discouraged and ready to quit. Furthermore, the customer was ready to have him quit. A Linde Service Supervisor appeared on the scene. He recommended a better type of welded joint. This was adopted. He suggested training a crew of welders. He outlined a plan for organizing the work; and then he withdrew. The job was finished—completely satisfactory—and ahead of time. We quote from the contractor:—

"... In these days of so much talk of service and so little except talk, the real service you have rendered to us, to our customer and, incidentally, to the general good of the welding business, is refreshing."

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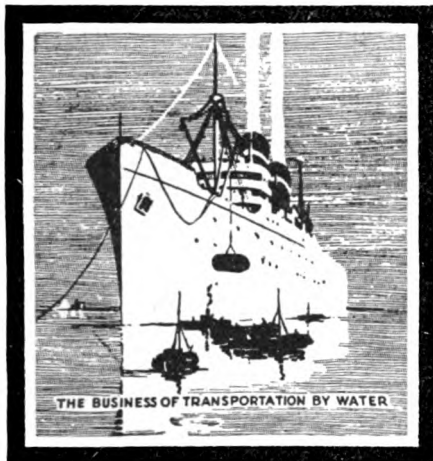
YOU CAN DEPEND ON THE LINDE COMPANY

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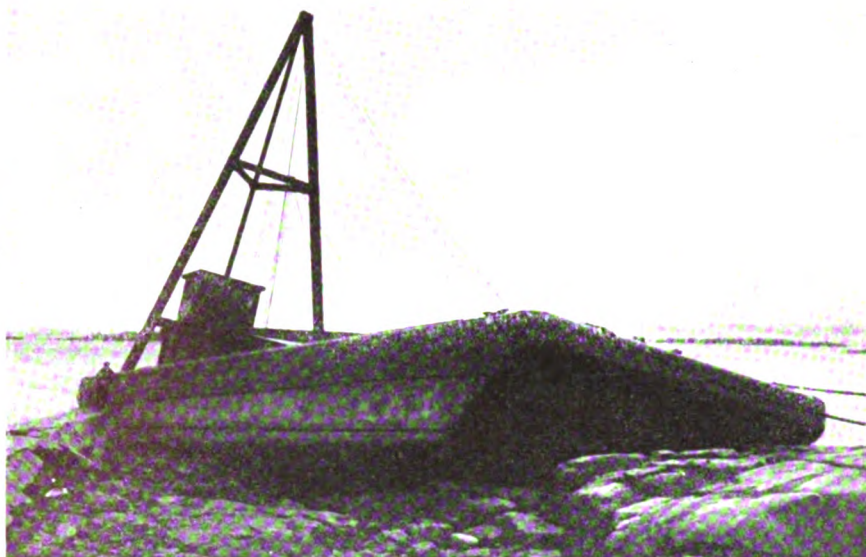
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ELLIS STEEL HULLS ARE STRONG

The
Proof



Piled Up on Rocks in Terrific Gale One of New York Central's ELLIS Barges Fails to Spring a Leak

IN the gale of Friday, November 13th, an Ellis Channel Steel Barge belonging to the New York Central, tore loose from her tow off Execution Rocks, Long Island Sound. Driving before wind and sea she pounded her way through an almost impassable barrier of shoals and rocks, piling up on the windward shore of David's Island. She lay there askew, her entire weight suspended only by the two ends resting on sharp rocks.

Sunday she was floated off and towed safely to New York. Not a line in the hull structure was deflected, not a seam was opened, not a single rivet was loosened. Strength and seaworthiness are assured by the Ellis Channel System of Steel Hull Construction, which also offers other outstanding advantages in lower construction and maintenance costs and greater deadweight capacity.

ELLIS CHANNEL SYSTEM OF STEEL HULL CONSTRUCTION

PATENTED

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30 CHURCH STREET, NEW YORK

Under the Ellis Channel System, rivets are driven by bull-riveters. In the giant grip of these machines the flanges of the channels are tightly compressed and every rivet is "flowed" so it completely fills its hole. The result is a singularly solid, impervious and indestructible ship joint.



Car Floats, Oil Barges, Coal Barges and similar vessels, including sea-going, harbor and inland water-way types, can be designed and built to exceptional advantage by the Ellis Channel System. Approved by the American Bureau of Shipping.

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The sixty-ninth congress of the United States convened in Washington, D. C., Dec. 7, 1925

What Is Congress Going To Do About It?

OUT of enormous expenditures of public money since the beginning and attended by colossal waste, the ninth annual report of the shipping board, as of June 30, 1925, accounts for a government owned merchant marine of 1245 ships of 8,563,150 deadweight tons of which 331 of 2,712,877 deadweight tons are in active service leaving 914 vessels of 5,850,000 deadweight tons laid up and idle. The figures for Dec. 31, 1925 will be but slightly different and with even a less number of active ships. To accomplish this over \$30,000,000 in losses was paid out of the treasury and \$24,000,000 is the lowest estimate needed to meet the losses of the coming year. This is, of course not taking into account interest and depreciation.

What will congress do about it? What would a clear headed prudent business man do about it? President Coolidge asked this question and got his answer from Henry G. Dalton of Cleveland. Secretary Hoover has answered this question and so has a committee appointed by the chamber of commerce of the United States. The American Steamship Owners association and correlated bodies have answered this question. All of these answers are available in full detail in neatly printed reports, and ought to be carefully studied.

The President has succinctly summarized the practically unanimous consensus of opinion contained in these reports as follows:

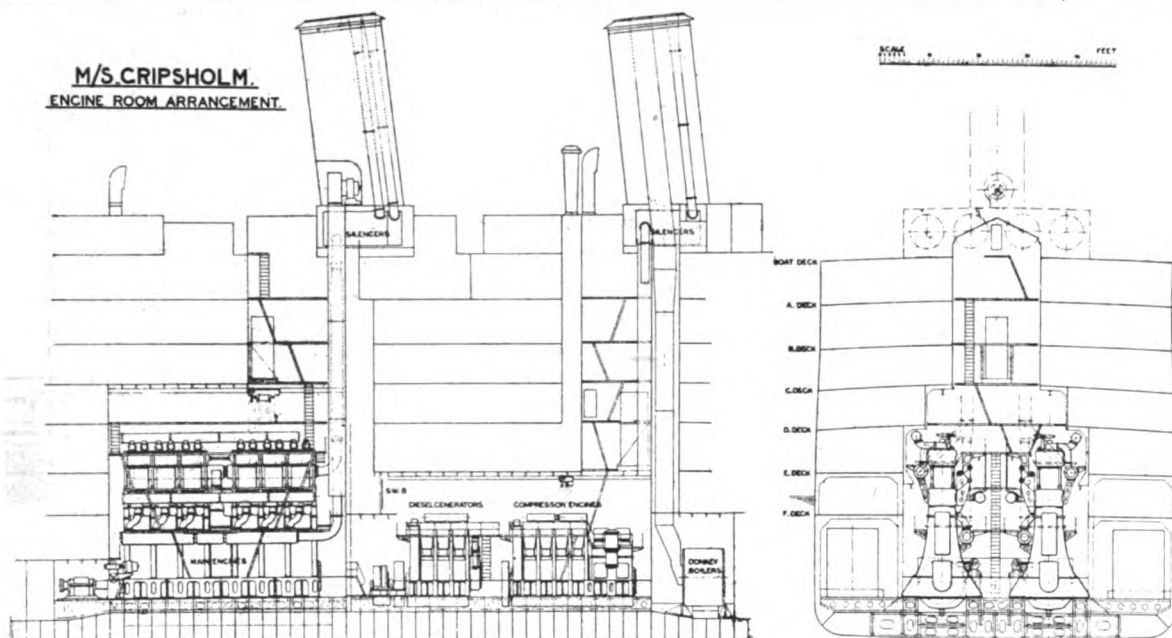
1. The surplus ships are costly to care for and ought to be sold.
2. The active fleet should be under the direct control of a single executive head.
3. The shipping board should exercise its judicial and regulatory function in accordance with its original conception.

If legislation along these lines is passed and private shipping is supported and encouraged by the removal of all hampering and restricting regulations while continuing to fully safeguard life and property and to protect the rights of American seamen, a great step forward will have been made in creating a real merchant marine.



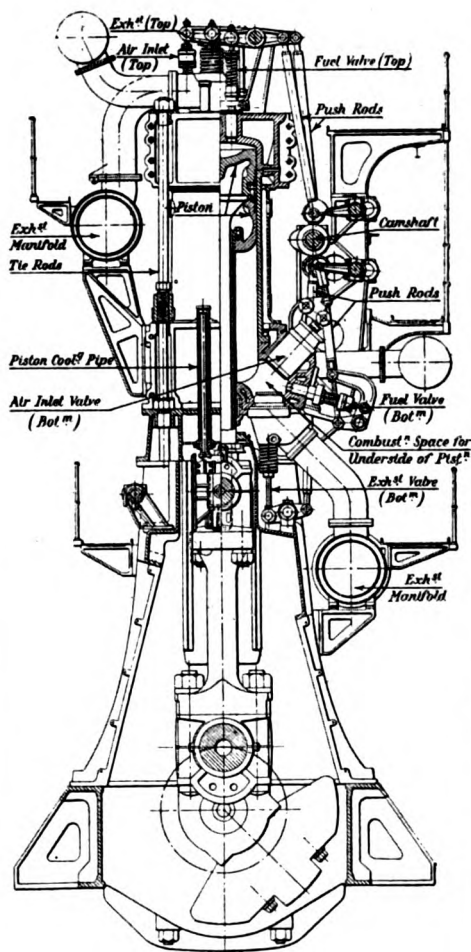
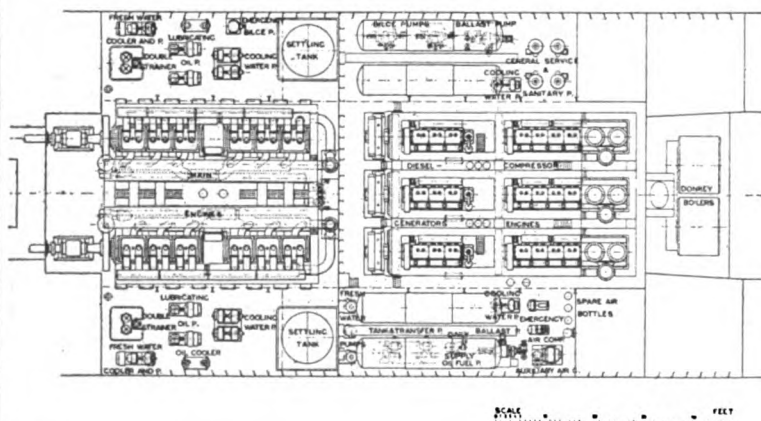
Double Acting Engines of Large Power

M/S. CRIPSHOLM.
ENGINE ROOM ARRANGEMENT.



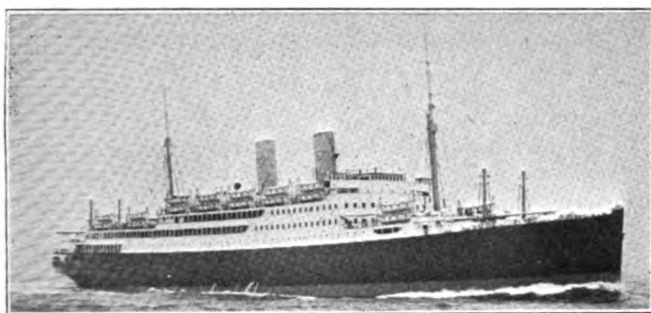
THE main motive power of the Gripsholm consists of two six-cylinder double acting Burmeister & Wain four-stroke cycle diesel engines, each developing 6750 shaft horsepower or 8150 indicated horsepower at 125 revolutions per minute. All auxiliaries have been eliminated from the main engines including compressors. The diameter of the cylinders is 33 inches and the piston stroke is 59 inches. Each cylinder gives 1360 indicated horsepower. These engines embody the usual practice of the builders but have fuel, air, exhaust and starting valves for both top and bottom of cylinders. To prevent the maximum temperature of combustion from reaching the piston rod it is, in the first place protected by a cast steel sleeve, and there is a special combustion chamber to one side of the cylinder and connected with it by a restricted passage. The accompanying sectional line drawing shows the principal features of construction. Layouts of main and auxiliary engine rooms are also shown. Directly forward of the main engine room in which are located the two propelling engines, is the auxiliary engine room with no less than six diesel engines. Of these, three are directly connected to air compressors for furnishing injection and maneuvering air for the main engine. Each engine is of 4 cylinders and 750 brake horsepower at 170 revolutions per minute. Three engines, each of 3 cylinder and 500 brake horsepower at 200 revolutions per minute are directly connected to dynamos of 330 kilowatts for the ship's electric power. Lubricating oil and cooling water pumps needed for the main engines are in the main engine room. Other auxiliaries are in the auxiliary engine room.

M/S. CRIPSHOLM.
ENGINE ROOM ARRANGEMENT.



Section through the Burmeister & Wain 4-stroke Cycle
Double-Acting Diesel Engine.

Motorship Gripsholm a New Departure

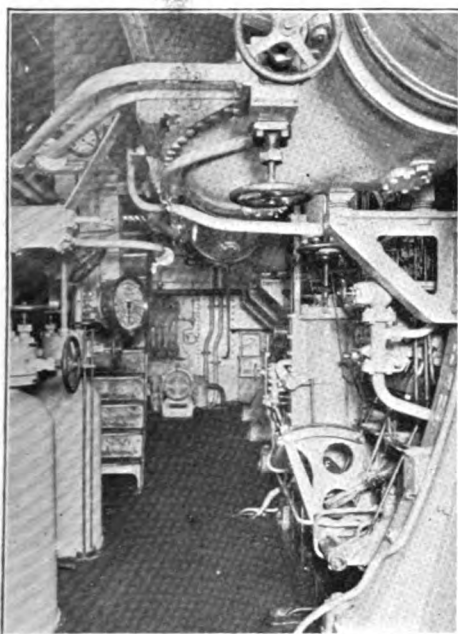


TWIN SCREW M. S. GRIPSHOLM—SWEDISH AMERICAN LINE

THE twin screw motor liner Gripsholm designed and built by the English firm of Sir W. G. Armstrong, Whitworth & Co., Ltd., for the Swedish American Line was accepted by the owners after successful contract trials on Nov. 5, 1925—Filip Lindahl, of the Brostroms Lines Agency and Sir John Biles & Co., the owners' naval architects, supervised the construction. Her maiden Westward voyage between Sweden and America began leaving Gothenberg Nov. 21 and ended arriving New York Nov.



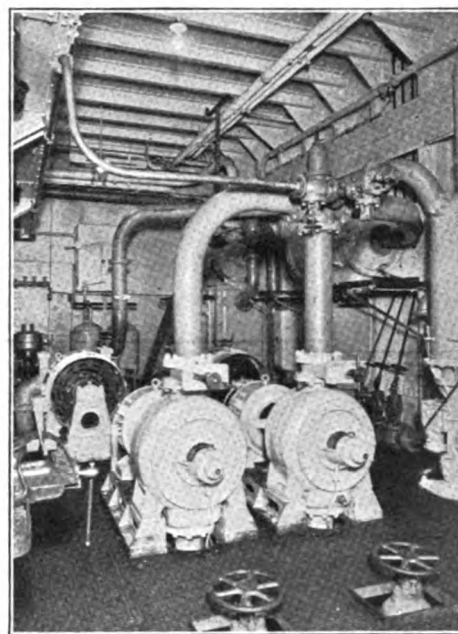
FIRST CLASS GALLERY "A" DECK



STARTING PLATFORM MAIN ENGINES

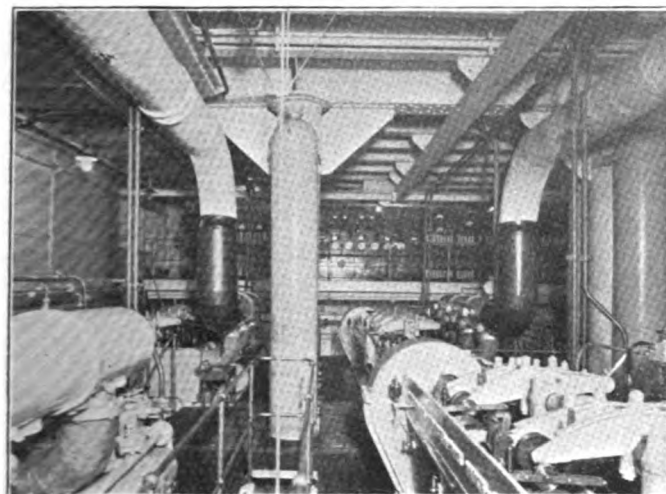
30 after an elapsed time of 8 days and 13 hours. According to reports all parts of the new ship functioned well. On the power and speed trials, Nov. 5 a high mean speed of 17.99 knots was attained, the engines developing a total of 17,155 indicated and 14,000 shaft horsepower at 130.8 average revolutions per minute. On the westward leg of the first voyage the average speed was 16.05 knots at 113 revolutions per minute with an average daily fuel consumption for all purposes of 64.75 tons.

Named after one of Sweden's historic shrines, the sixteenth century castle of Gripsholm, interior decorations and furniture conform in design to the general style and period of the famous halls of the castle. The principal hull particulars are: Length overall 574 feet 6 inches; length between perpendiculars, 550 feet; breadth extreme, 74 feet 3 inches; breadth molded,

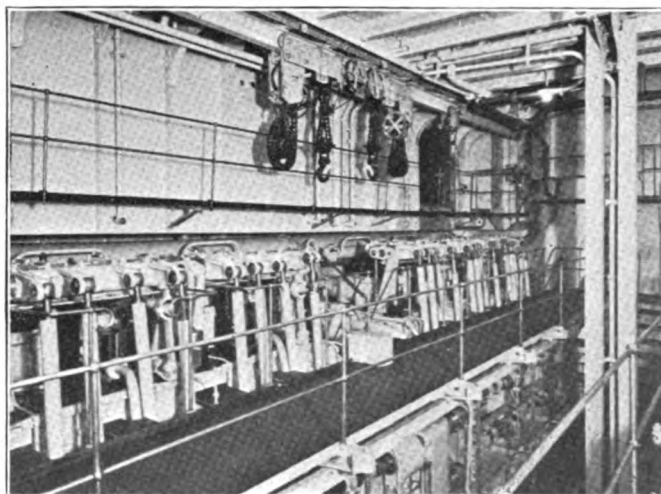


BOTTOM PLATFORM STARBOARD

(Continued on page 48)



AUXILIARY ENGINE ROOM TO SWITCHBOARD GALLERY



MAIN ENGINE ROOM TOP PLATFORM

Andrew Fletcher 1863-1925

IN THE death of Andrew Fletcher at his home in New York Nov. 29, 1925, the marine engineering industry of the country has lost one of its outstanding figures. Through his engineering and executive talents and his diversified business interests brought him to the presidency of the American Locomotive Co. and as a director in many other very large enterprises outside of the marine field, it is as an exceptionally successful designer and builder of marine engines and as head of the old established yard of W. & A. Fletcher Co., Hoboken, N. J., that he was best known. He was born in New York City, June 8, 1863, the son of Andrew and Mary Ann Pollock Fletcher. His grandfather, Andrew Fletcher, came to America from Scotland in 1825. His father, the second Andrew Fletcher, was a celebrated designer and builder of machinery for steamboats, and the most famous contractor for building steamboats of his time. He established the firm of Fletcher, Harrison Co. in 1852, and held the same position in the succeeding partnerships which carried on the business under the titles of W. & A. Fletcher and W. & A. Fletcher Co. The most important steamboat machinery designed and installed by the elder Fletcher was that of the celebrated MARY POWELL, the pioneer among the numerous pleasure and excursion boats plying the Hudson; the palatial steamers of the Fall River Line connecting New York and Boston, the PURITAN, PRISCILLA and PLYMOUTH; the Hudson River Day Line steamers, the ALBANY, NEW YORK and C. VIBBARD; Mr. J. Pierpont Morgan's yacht CORSAIR, probably the most widely known and best equipped steam yacht in this country and Europe.

Andrew Fletcher thus came to a family of engineers and was identified with the development of marine en-

gineering almost since his childhood days. He was graduated from the College of the City of New York, class of 1883. He next took a private course in naval architecture which he supplemented with six years work at the trade of machinist, gaining his training in the works of the W. & A. Fletcher Co. Following this apprenticeship, during which he became thoroughly grounded in the principles of marine engineering, Mr. Fletcher took the position of chief engineer of the company in which capacity he continued for the next 16 years. He then became vice president, and in 1905, following the death of the elder Fletcher, was elected president and treasurer of the company, an office which he held until his death.

Under Mr. Fletcher's administration of its affairs, the W. & A. Fletcher Co., already famous as the builders of marine machinery, became known as the firm which has built more machinery for more steamboats than any shipbuilding enterprise in the United States. During Mr. Fletcher's incumbency of the executive office, the W. & A. Fletcher Co. became the first contract builders in the United States of Parsons' marine steam turbine-driven ships and constructed the first three ships of that type put into commission, the S. S. GOVERNOR COBB, S. S. YALE and S. S. HARVARD. In addition to the steamships already mentioned for

which the W. & A. Fletcher Co. has been responsible were many others of great importance in river and inland navigation. Some of these were the Hudson river steamers HENDRICK HUDSON, WASHINGTON IRVING, ROBERT FULTON, BERKSHIRE, TROJAN and RENSSELAER, all remembered with a thrill of pleasure by travelers and vacationists from all parts of the globe; steamers that ply the Great Lakes; Lake George and

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Steamboat Inspection Service

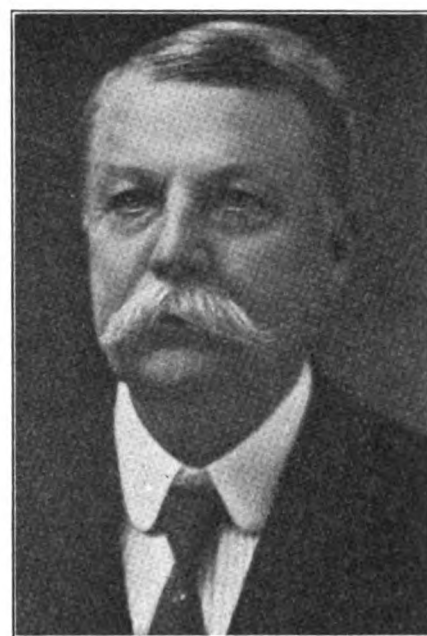
Suffers Loss

in

Resignation of Uhler

Many Constructive Changes Have Been Made in the Rules and Regulations During the 23 Years of His Leadership—The Scope and Responsibility of Inspection Has Been Steadily Increased

BY D. N. HOOVER
Deputy Supervising Inspector General



George Uhler, supervising inspector general, steamboat inspection service, from April 1, 1903 to Dec. 31, 1925

IN ORDER to get a correct picture in perspective of the man who has served as supervising inspector general of the steamboat inspection service for the last 23 years, it may be well to tell something of the history of that service. The act of congress approved July 7, 1838, which provided for the inspection of the hulls and boilers of steam vessels, was the first legislation upon the important question of "the better security of lives of passengers on board of vessels propelled in whole or in part by steam." By this act the inspectors were appointed by the district judge of the United States for the district in which the vessel was inspected, and were paid by the steamer the sum of \$5 each for each inspection.

This act provided for lifeboats, signal lights, fire pumps and hose, and also for iron rods or chains in place of rope for steering gear. The boilers were inspected every six months and the hulls every twelve months, and it was also required that steamers employ "a competent number of experienced and skillful engineers." Certificates of inspection were required "to be posted up and kept in some conspicuous part of the boat for the information of the public." The act of July 7, 1838, was modified by the act approved March 3, 1843, which provided for additional steering apparatus, but exempted certain vessels

from the requirements of the previous act. An act of congress approved March 3, 1849, provided for signal lights for all vessels.

The act of congress approved Aug. 30, 1852, was really responsible for the establishment of the present steamboat inspection service, and was known as the "steamboat act." This act amended the act of 1838, and provided for the appointment and payment of nine supervising inspectors, and for local inspectors at various ports. It also provided for lifeboats, life preservers, other life-saving equipment, for the licensing of engineers and pilots for passenger steamers, and for the stamping of boiler plate. This act is therefore the foundation upon which the whole superstructure of the steamboat inspection service has been raised, and it was modified and amended in minor particulars by the various acts of March 3, 1853, April 29, 1864, June 8, 1864, March 3, 1865, and July 25, 1866.

Service Founded in 1852

The act of congress approved Feb. 28, 1871, gave us what is really the present law upon the organization and administration of the steamboat inspection service, and although amended and changed from time to time it is, in fact, the basis of our present practice. This act provided for the appointment of a supervising

inspector general and created a board of supervising inspectors, designating also the time and place of meeting of said board and defining the duties thereof. It provided for the inspection, testing, and stamping of material entering into the construction of marine boilers, a provision which has proven of the highest value and importance in the prevention of explosion and loss of life.

It will thus be seen that the steamboat inspection service is one of the oldest in point of continuous existence in the Federal government. There now exists the possibility that this service will be united with some other arm of the government, or that it will be abolished entirely. Whether or not this comes to pass, the fact remains that the functions that have been exercised by the service must be continued by some arm of the government.

If the general rules and regulations prescribed by the board of supervising inspectors as those rules and regulations existed in 1903 are examined and compared with the general rules and regulations as they exist in 1925, it will be found that the present edition is full of constructive details that have been adopted in the last 23 years, all of which shows the strong guiding hand of General George Uhler, because they have been largely his work. At the time

(Continued on Page 52)

Cut Costs by Conserving Fuel

Application of Fuel Conservation and Engineering Performance Standards to Shipping Board Vessels

BY C. J. JEFFERSON

IN CONNECTION with this paper, reference should be made to a paper presented in November, 1923, which describes the methods by which these standards have been developed. In order to put these standards to practical use, it was necessary first of all to establish a systematic inspection of the active vessels of the fleet and their performance. From a continuous record of these performances it is determined whether improvements in operation are being obtained on the vessels, and what effect modifications made in the equipment of these vessels have on their performance.

Fortunately a nucleus of such type of inspection had already been created, and it was only necessary to extend the scope of its work and to draw up an inspection report form giving the chief items which will affect the economy of operation; this form to be concise and yet to have sufficient data so that, when subjected to analysis by technical and practical engineers, it would give a true picture of operating conditions.

Voyage Reports

This form, during its early stages, was modified several times so as to meet the requirements of the different departments, as they realized the value of a continuous report of this sort in their various branches of the shipping business. The first page is headed with a brief description of the physical characteristics of the vessel, which serves to classify the type of the particular vessel covered by the report. Following this is an analysis of indicator cards which is filled out for reciprocating steam-driven vessels. A brief report of the physical condition of the various departments and equipment of the vessel is given, together with a rating based on an A. B. C. D. schedule, in which A is excellent; —A, very good; +B, good; B, fair; —B, probation mark; C, poor, and D, exceedingly poor. The engineer officer personnel is also rated under three headings, "mechanical ability," "discipline" and "efficiency," these ratings to represent

the degree of each of the above characteristics shown on this particular voyage. The engine department crew, its equipment and the operation of the vessel are also rated by the same schedule.

In order that the ratings shall be of real value, the inspection must be made by a competent, experienced and well-selected inspector, who will make an unbiased report entirely free of any personal prejudice. At the lower part of the voyage report form an outline chart of the world is given upon which is shown the particular

the conditions, for each of the passages of the voyage.

Through this system of inspection close touch is kept with the operating vessels of the fleet, and it becomes a comparatively simple matter to determine the relative performance of any particular vessel at any time and to direct efforts for improvement toward the poorer performers so as to bring them up to the standard of their sister ships. A report such as this, made at the termination of each voyage of a vessel, has a marked beneficial effect on the efforts of the

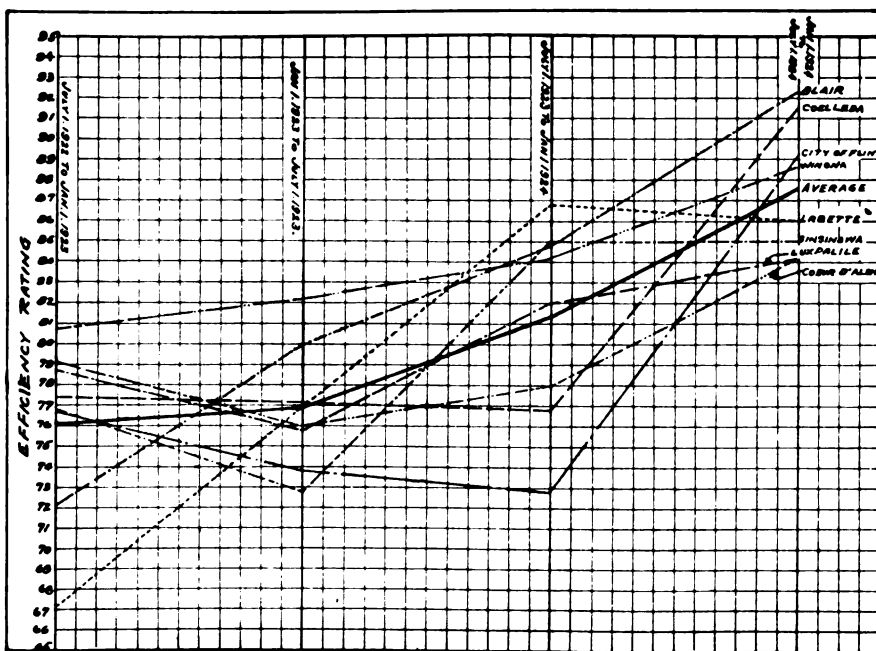


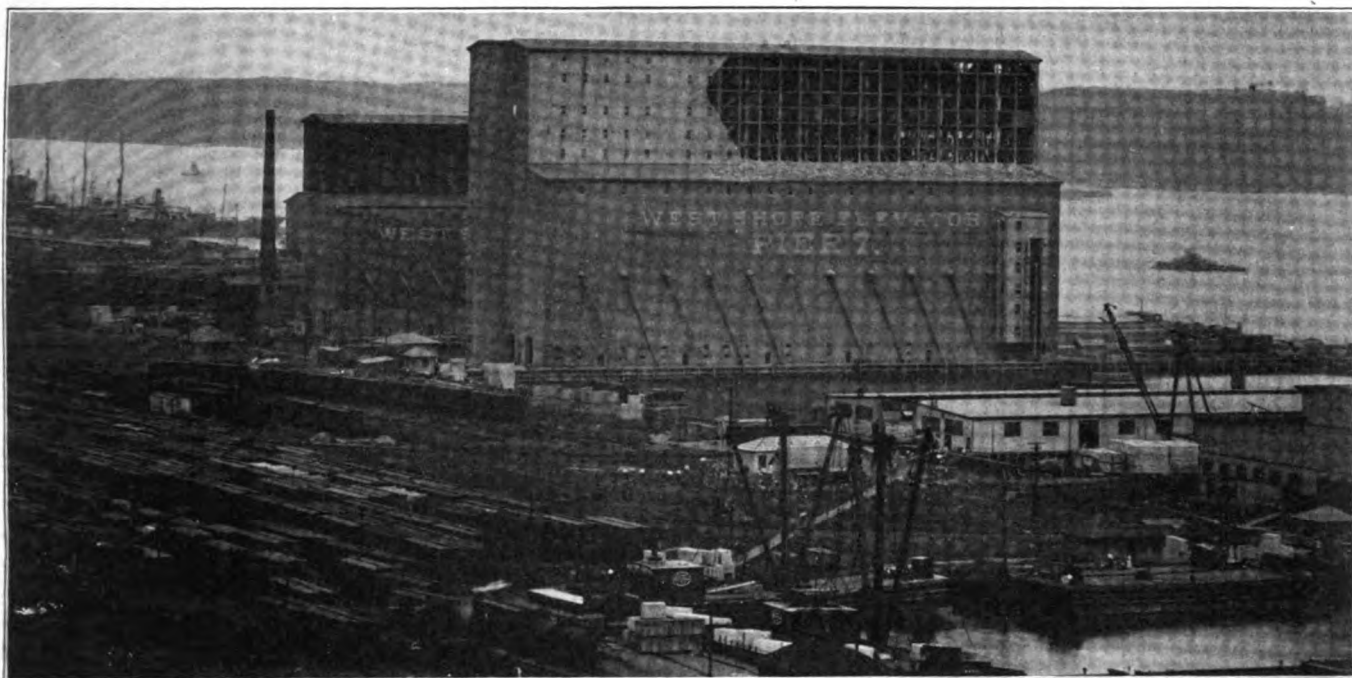
CHART SHOWING IMPROVEMENT IN SEA PERFORMANCE OF A NUMBER OF VESSELS—ALSO THE AVERAGE INCREASE IN EFFICIENCY

route in which the vessel operates. This chart is used simply as a quick means of route classification. On the first page is also given the fuel summary, which gives a continuous record of the bunkering and consumption of the vessel and checks the fuel consumption, which is shown on the second page under headings of "Sea Consumption," "Port Consumption," and "Consumption in Pilot Waters." The second page is given over to operating conditions on which are recorded the chief items that affect the economy of operation of the engine department. The data tabulated in each of the several columns represent

operating personnel. They are not only kept advised as to their own performance but also of those of their sister ships. This stimulates that competitive spirit which is so characteristic of the American engineer and which enables him to overcome seemingly impossible obstacles. It is apparent also that by means of these inspection reports it becomes comparatively easy to determine, from an operating standpoint, the relative standard of operating efficiency of the managing operators, and in this way to materially assist in arriving at a decision as to which operators

(Continued on Page 38)

A paper read before the Society of Naval Architects and Marine Engineers by C. J. Jefferson, head fuel oil conservation section, Emergency Fleet Corp., New York.



New York Central's Weehawken terminal with piers, elevators and yard—steam hoist lighters in the foreground and open deck scows in the slips

Ship Operators Can Save Time

Freight Transfer Between Rails and Ships Can Be Quickened by Close Co-operation—Study Marine Operations of Railroads in New York Harbor

BY G. S. CLARK

THE other fellow's job always seems complicated if you don't know anything about it, but after you have had a chance to make a primary analysis, it very often shapes up like your own. Some time ago two friends from Vermont paid me a visit. They were railroad men, and suggested that a trip around New York harbor might interest them. It did and it was more interesting still to me to watch their expressions as from the pilot house of a shifting tug, they took in the handling of barges in and around slips and up and down the North river. One of them exclaimed, "Why this kind of work is exactly the same as that of a railroad, only the tracks are missing."

New York harbor is just the same as any railroad, only the tracks are missing. However, there is a water substitute for thousands of tracks. Shifting of lighters is synonymous with switching of cars. Towing is the same as "way freights" and "jigger trains" and ferry service takes the place of passenger trains. Movements are made on schedule and "extras"

are run in greater profusion. We have our dispatchers and towing orders,

Freight Is Transferred From Rail to Ship

The efficiency of water transportation activities of railroads terminating at tidewater in a great domestic and foreign shipping center like New York is of the utmost importance to steamship operators. Vast quantities of freight are moved to the port by rail to be transhipped by steamer to destination, and steamships in turn bring in freight for rail shipment.

The turn around of ships may be said to depend in a large measure on the kind of service afforded by the marine departments of the rail carriers. On the other hand the steamship operator can help to expedite the transfer of freight by complete co-operation, by being ready to deliver and receive freight promptly at the time stipulated. This article tells how the railroads serving the port of New York carry on this interchange, and their other marine activities.

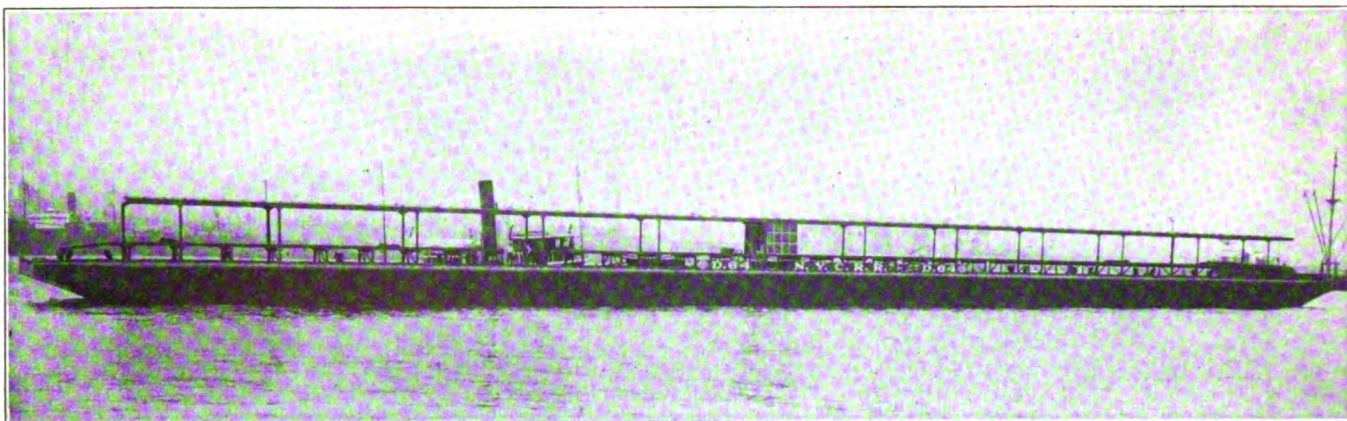
The perimeter of the lighterage limits of New York harbor measures about 75 miles and is made up of the Hudson or North river, East river, Harlem river and the Lower bay. About 60 per cent of this perimeter has piers and bulkheads given up to the handling of different items of commerce. The ownership is invested in individuals, corporations and municipalities.

The railroads all terminate on the New Jersey shore with the exception of the New York Central, which terminates on Manhattan, the New York, New Haven & Hartford, which has its terminal in the Bronx, the Long Island, which stops in Long Island City and the Baltimore & Ohio, which has its terminal on Staten Island. Railroads terminating on the Jersey shore are the Pennsylvania, (except passengers), the Lehigh Valley, Central Railroad of N. J., Delaware, Lackawanna & Western, West Shore, and the Erie. These terminals consist of piers, ferry slips and carfloat bridges together with east and west bound yards. It is at the piers, slips and float bridges that the rail movement of freight ends and this story starts.

Three generations ago lighterage

G. S. Clark is the assistant manager of the marine department of the New York Central railroad, New York City.

similar to railroads, with more "rails" and many more "stations."



THE LATEST TYPE OF STEEL FLOAT—ALL STEEL, EVEN THE PLATFORM AND HOOD—366 FEET LONG, CONSIDERABLY LONGER THAN THE OLD WOODEN TYPE

was more theory than fact. Imitators of Hendrick Hudson were still in swaddling clothes and the sail boat was still supreme. After the Civil War and continuing up to about the year 1910, sail lighters plied about New York harbor doing a regular delivery business. Towboats were first used in this harbor in about the year 1860.

Barges, scows and lighters of all types followed as the different demands arose and as the different railroads,

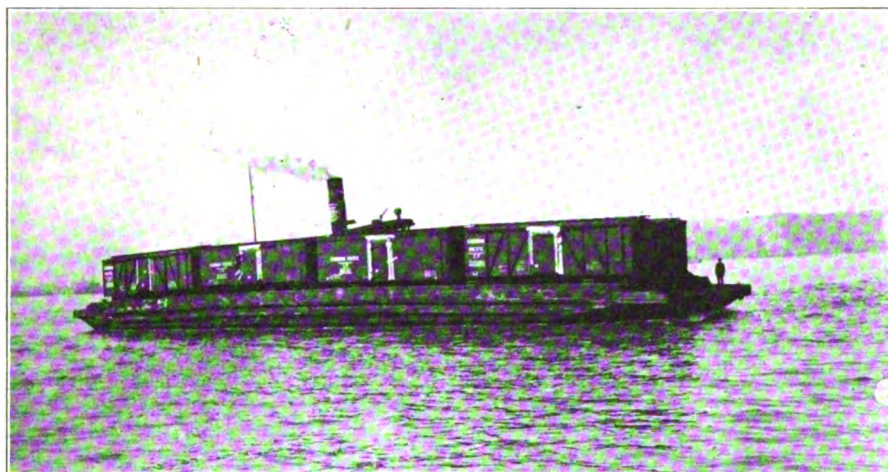
railroads, has developed into a super-division. From a few thousand dollars worth, the capital accounts of marine equipment has risen to many millions of dollars.

The draft horse of the harbor is the tug boat. We still have with us types of this craft built as far back as 1859, and I believe that I am correct in stating that the WILLIAM S. EARL of the Cornell Steamboat Co., was one of the first craft to be built of the present and common type of

were wood and it was quite a few years after the Civil War before iron was first employed in hull construction. Ferryboats were first constructed of iron about the year 1860 and it was shortly after this that it was first employed in tug boat construction.

Hulls Now Built of Steel

The first steel boats came to us in about 1896 in the form of ferryboats and in 1899 tug boats followed suit, but after all these years of progress the wooden tug boats are still in the majority. These are engined with many types of steam plants but during the last two years quite a number of Diesel motors have come into use. It is a conservative statement to say that from now on diesel installations will outnumber those of steam. This is borne out by the number of internal combustion units installed



AN OLD TYPE OF OPEN WOODEN TRANSFER FLOAT MOVING FREIGHT CARS

that go to make up the New York group were built. There was no uniformity of dimension as wharfage was not based on tonnage as now prevails. Inter-lighterage orders were carried by messengers until the advent of the telephone.

Departments Have Grown Large

The accounting, billing and contract work was carried on fundamentally the same then as now, except the volume has increased enormously and many short cuts have been formulated to speed up orders. The marine department of the past, a wart on the side of the freight departments of the



CAR FLOAT WITH TUG ALONGSIDE, PLATFORM STATION FLOAT, STEEL HULL WITH WOOD STAVING AND WOODEN PLATFORM AND CANOPIES

tug boat, as we know them. The ATLAS of the Newtown Creek Towing Co., built in 1864 is still plying about this harbor and is another fine example of what the artisans of old could turn out. These original tugs of course

in the last year and those contemplated, together with the apparent satisfaction the ones now in operation are giving.

Ferryboats have undergone a more
(Continued on Page 44)

Shipbuilders Back Exhibition

High-class Marine Exhibits at Olympia, London—Co-operation of Shipbuilders, Engineers and Ship Operators Make British Show a Success

BY VINCENT DELPORT
European Manager Marine Review



British Marine exhibition at Olympia, London, Nov. 23 to Dec. 5, 1925—A wide variety of fine exhibits displayed the skill of Britain's shipbuilders and engineers.

THE shipping, engineering and machinery exhibition which was held at Olympia, London, Nov 23 to Dec. 5, 1925, was supported by the leading marine engineering firms of Great Britain. Comprising over 220 exhibits, the show was organized under the patronage of the British Engineers' Association, Inc., the Society of Motor Manufacturers and Traders, Ltd., the Ship and Boat Builders' Association, Ltd., and the British Marine Oil Engine Manufacturers' association. The formal opening took place on Nov. 23 and was presided over by the Right Hon. W. C. Bridgeman, first lord of the admiralty. At a luncheon presided over by Sir Charles Parsons, chairman of Parsons Marine Steam Turbine Co., Ltd., Wallsend-on-Tyne, a toast was proposed to "shipping and commerce" by the Right Hon. Walter Runciman, M. P. Mr. Runciman, speaking as a shipowner, stated that British shipping is passing through one of the worst depressions in its history, and

he said that it is only under the pressure of bad times that shipowners have the greatest inducement to change types, designs or equipment, and that the engineers have an

Index for 1925

The index for the year 1925 covering all of the valuable editorial material which appeared in MARINE REVIEW last year is now ready for distribution and will be sent to subscribers on request.

opportunity to show their enterprise and ingenuity.

Recent progress in the principles and applications of marine engineering was conspicuous in many respects, especially in the use of perlit cast iron for castings, the use of electricity for driving pumps, compressors, trucks and dock equipment. Devices for the safety and comfort of crews and

passengers, including the latest designs in wireless sets were exhibited. The number of internal combustion engines displayed spoke for the increasing favor shown to this feature. A wide diversity of exhibits were shown, including steam and internal combustion engines, boilers, oil separators, pumps, compressors, winches and refrigerators, life-saving appliances, nautical instruments, welding equipment and tools, and various accessories.

Shipbuilders Are Represented

The Burntisland Shipbuilding Co., Ltd., Burntisland, displayed photographs of completed steamers, and a model of a 6300 deadweight vessel designed for carrying grain and general cargo on shallow draft. The Parsons Marine Steam Turbine Co., Ltd., Wallsend-on-Tyne, showed a model of the latest geared turbine installation of 5000 shaft horsepower, for merchant work. Steam is generated in water tube boilers at a pressure of

(Continued on Page 56)

From the Old Log Book

Stray Items About the Great Lakes, Atlantic, Pacific and Gulf Coasts and Inland Rivers from MARINE REVIEW Files of 10, 20, 30 and 42 Years Ago

JANUARY 1884

UNDER the heading of "Naval Affairs, the *Marine Record*, Jan. 3, 1884 (then the name of MARINE REVIEW and a weekly) in commenting on the naval defences of the country said, "The commissioners recommend that the navy yard at New London, Conn. be abandoned and the rest maintained, and urge the importance of preparation in time of peace for war. 'War', they said, 'is a heritage of man and of the people of the United States. History will have been written in vain should they delude themselves with the idle hope of perpetual peace; and when war does come in these modern days it is swift and terrible. Exposed and unprepared as we are, the damage that could be inflicted upon us ere the note of warning was well sounded, would be beyond calculation. But unmindful of the great lessons of war, we wait for the emergency hour to force us into measures that should have already matured.'"

* * *

This recommendation made by the so-called commissioners of the navy 42 years ago is very much up to date and is just as appropriate today as it was when first issued, the Great War having demonstrated again the enormous losses of unpreparedness.

JANUARY 1896

IN VIEW of the very active steps now under way, to prevent the diversion of lake water through the Chicago drainage canal, an item in MARINE REVIEW for Jan. 2, 1896, is interesting. It seems that Senator Brice was in correspondence with leading engineers throughout the country who had for several years advocated the construction of a dam in Niagara river and brought the subject up in the senate. The senator's engineering supporters had contended that the army engineer corps was wrong in not taking up this method of increasing the draft of water on the lakes.

* * *

This suggestion made 30 years ago

has been revived from time to time and it is possible that a measure of this sort would serve as a controlling medium for keeping the depth of the lakes at a more or less constant figure. Certainly Chicago should be stopped from diverting vast quantities of water through her drainage canal. It may be that the scheme recently proposed by certain Canadian authorities for damming the Albany river, which now empties into the Hudson Bay, and building up a new vast lake as a reservoir which would drain into Lake Superior, would be helpful. All this drainage from a great territory now flows uselessly into Hudson Bay.

* * *

An item in MARINE REVIEW 30 years ago mentions that W. I. Connors well known stevedore of Buffalo had purchased the *Enquirer*, one of that city's afternoon papers. The item goes on to say that he had become very wealthy and that in addition to his interest in the business of handling freight at Buffalo, he was the principal owner of a large brewery and a director in two banks.

JANUARY 1906

THE MARINE REVIEW for Jan. 4, 1906 calls attention to the fact that exclusive of Canadian yards, there were 39 vessels under order on the Great Lakes for 1906 delivery. Of this number 34 were bulk freighters, two package freighters, two car ferries and one a passenger steamer. It goes on to say that the significant thing about this building program was that a fair part of it was ordered early in the summer of 1905, a thing unprecedented in the history of the Great Lakes as new vessels are not usually contracted for until late in the fall. It was about this time that the Steel corporation ordered four additional steamers to be 600 feet over all, 580 feet keel, 58 feet beam and 32 feet deep with a carrying capacity of 12,000 tons each. Up to the present day these sizes have not often been exceeded.

* * *

A complete illustrated article is given of the new Canarder, the turbine liner, Carmania.

The resignation of Mr. Henry Penton, as chief engineer of the Great Lakes Engineering Works in Detroit, to be succeeded by his assistant A. G. Mattsson, was noted in MARINE REVIEW 20 years ago. It mentions among the ships designed and built under his supervision the car ferry DETROIT, the bulk freighters JAMES C. DAVIDSON, HOOVER, MASON, SUPERIOR, PETER WHITE, WILLIAM G. MATHER, DELAWARE, GEORGE H. RUSSELL, FRANK J. HECKER, FRANK C. BALL and B. J. JONES. Mr. Penton continues active in lake marine circles as a naval architect and marine engineer.

JANUARY 1916

THAT MARINE REVIEW has been fairly consistent in its opposition to government ownership seems evident from a reading of the January number 1916, in which a portion of President Wilson's message to congress is quoted proposing government ownership and operation. President Wilson said in part, "But capital cannot accomplish this great task of a sudden, and with a view of meeting these pressing necessities proposals will be made to the present congress for the purchase and construction of ships to be owned and directed by the government." MARINE REVIEW pointed out editorially at the time that the president displayed great weakness in his lack of appreciation of the practical problems of commerce and industry.

* * *

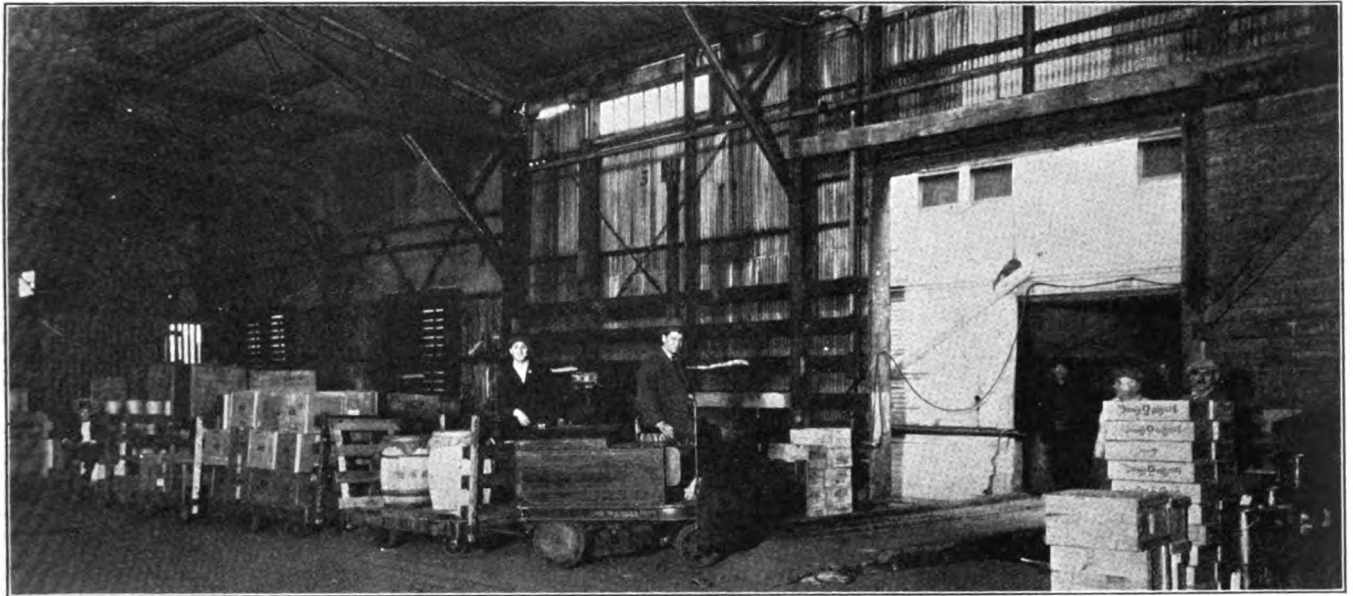
The effects of the Great War going on in Europe had already begun to be felt in the shipbuilding industry. An item in MARINE REVIEW ten years ago lists the new shipbuilding placed, and noted that all leading yards were busy.

* * *

The newest motorships according to an item in Marine Review ten years ago, then being built were over 400 feet in length which was very nearly as large as the White Star liner Britannic which was one of the first big Trans-Atlantic liners propelled by steam. The item mentions the Tongking for the East Asiatic Co. and a sister to motorships Siam and Milaka.

Dock Management Progress Section

How Successful Dock Operators Have Met
Problems of Giving Best Service to Ships



Loaded train of trucks drawn by tractor entering steamship of Hudson Navigation Co., at midship gangplank

Reduce Costs of Handling Freight

DURING the last summer season four combined freight and passenger boats were operated by the Hudson Navigation Co. between New York, Albany and Troy. The two boats that ply between Albany and the metropolis each have a freight capacity of approximately 1000 tons, while the two Troy boats are rated to carry 500 tons each. During most of the season of open water, usually somewhat over eight months, one boat is loaded at Albany, one at Troy and two at the Desbrosses street pier of the company in New York every day. Inasmuch as it is the slogan of the concern to provide "express service at freight rates", it is natural that an efficient organization for the rapid handling of freight should have been developed.

At all three points electric tractors, trailers and hand trucks play a part in the scheme of handling. The hand trucks are used on short haul work—over distances rarely exceeding 50 feet—leaving the larger part of the handling to power equipment. Four tractors are in service at New York, two at Albany and one at Troy. Approximately 250 trailers are constantly circulating on the four boats

BY P. D. ROCKAFELLER
General Agent, Hudson Navigation Co.

that ply between the three points, being distributed according to volume of traffic and the nature of merchandise handled.

Saving Depends Upon Service

As is the case with practically all types of power driven equipment, the earning capacity of storage battery tractors depends largely upon the number of hours that they are in service. Each tractor that is allowed to work fairly steadily throughout a working day of 8 hours or longer is capable of earning a net of at least five times the wages of a longshoreman. At the northern terminus of one of the New England coastwise steamship lines, five tractors in comparable service are known to have lowered the cost of handling general cargo approximately \$.18 per ton, a reduction from \$.68 to \$.50. Considering the annual tonnage handled at this point this works out to a net annual saving of \$25,000 effected by the fleet after all overhead has been deducted.

To determine the net saving effected by electric tractors of this type, care-

ful analysis of costs has been made by another freight handling concern operating on the New York waterfront. It has been found that the charges to be made against the equipment are interest on truck and battery, depreciation, taxes and insurance, power, maintenance and garaging. For an 8½ hour day this figure worked out to \$3.46. The net saving effected is at least equal to the difference between the wages formerly paid longshoremen for doing the same work and this figure.

To obtain a reasonably clear picture of the manner in which the tractor-trailer method has been worked into the operations at the New York, Albany and Troy docks of the Hudson Navigation Co. it is necessary to consider the physical layout in each case, the nature of the handling problems and such other factors as come into play.

At New York the pier at which the two boats tie up is approximately 800 feet long and 135 feet wide. All of the incoming freight, which is received at a platform adjacent to the street, is loaded directly onto trailers—excepting only shipments of

(Continued on Page 35)

How to Prepare Pulverized Coal

A Resume of the Crushing, Drying and Other Processes Involved
in the Use of Powdered Fuel—May Be Used on Shipboard

BY H. G. BARNHURST

PULVERIZED-COAL firing has been so extensively adopted for boilers during the past few years that the methods of preparation of the fuel have become a matter of considerable interest to the engineering profession in general. It is the purpose of this paper to outline briefly such of these methods as have gained a field of use sufficiently wide to involve standardization of the major details in central pulverizing plants.

Three operations, crushing, drying and pulverizing, are generally required, and in addition proper means of transportation of the material are necessary. Crushing is eliminated when the coal as received is already small enough to be a satisfactory mill feed. Drying, likewise, may at times be eliminated when the moisture content of the coal as received is very low; but as this is largely a seasonal characteristic, elimination of the drying equipment is not to be recommended.

Crushing Comes First

The crushing operation is necessary, not only to reduce the coal to a size suitable for the pulverizers, but also to expose larger surfaces to the hot gases used for drying. Any standard type of crusher can be used, but crushers having the ability to reduce the coal to proper size in one stage, and without excessive consumption of power, are preferable. To make a satisfactory mill feed, the product of the crusher should pass a 1-inch or 1½-inch ring to suit the present standard sizes of mills.

Coal may be stored before or after crushing. This does not effect the pulverizing, and is generally determined by the plant layout. If stored outside it is recovered by means of an overhead or locomotive crane, and then delivered to a hopper located below the tracks. A feeder, usually of the apron type, is attached to the hopper and transfers the coal directly to the bottom of the hopper and transfers the coal directly to the crusher, which discharges into an elevator de-

livering into a bin, from which it is fed to the drier.

The necessity of drying the coal before pulverizing has been often called into question, particularly by operators whose coal supply is normally of low moisture content. The facts are inescapable, however, that drying the coal considerably increases the capaci-

ties and burns more readily in the furnace, and, as the moisture must be removed either before or after entering the furnace, the effect on fuel economy is almost negligible. Even when coal is very dry as normally received, there will be occasions when the weather will make drying essential, and the absence of proper drying equipment may cause interruptions that will prove to be far more costly than its provision would have been.

Drying Is Essential

Two types of driers are available: the rotary, which has been standard for many years, and the vertical stationary type, of comparatively recent development. The former consists of a rotating shell, slightly inclined and ribbed internally, through which the material passes by gravity in conjunction with the rotation of the drier. The hot gases are usually passed around the outside of the shell before entering and flowing through it in direct contact with the material, which is picked up by the ribs and dropped across the path of the gases. This is known as the indirect-fired type of rotary drier.

The vertical drier is a sectional box through which in the usual arrangement the coal flows by gravity on its way from the storage bin to the pulverizer. Hot gases under fan pressure or suction pass through the interstices in the body of the material and carry off the moisture. These gases are preferably taken from the boiler stack, in which case the term "waste heat drier" is usually used. Steam-heated surfaces may also be incorporated in this drier to assist the evaporative action of the gases. The fact that this drier is stationary and occupies less space than an equivalent rotary drier not to mention its lower cost, makes it preferable under certain conditions.

"Cyclones" are essential for removing the dust in the discharge gases from a rotary drier, and are desirable with a vertical drier, particularly when the coal contains a considerable proportion of fines. A large volume of comparatively low-temperature gases is generally desirable, and pyrometers or thermometers are used to permit proper control. In summer

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Well Known Engineer on Powdered Coal

Ernest H. Peabody, president of the Peabody Engineering Corp., in an address before the technical committee of the American Steamship Owners' association, pointed out that pulverized coal had been successfully burned in shore plants for some time, notably in connection with the manufacture of cement. Land practice, however, had been accomplished through large furnace volumes which are impossible to secure in marine practice.

Recently it was discovered that turbulence of the gases, which may be obtained by giving the air for combustion a rotary motion, makes it possible to reduce the furnace volume well within the limits of marine water tube boilers. For Scotch boilers Mr. Peabody stated that while he believed that they can be adapted to powdered coal, the first installation would be more or less in the nature of an experiment.

This question he declared would be settled by a thorough test in a marine Scotch boiler plant at the Philadelphia navy yard. The test will take place in January under the combined auspices of the bureau of mines, navy department and shipping board, and then accurate data will be available.

The economy to be obtained by the use of powdered coal Mr. Peabody believed would far offset any additional costs for equipment.

ty and reduces the power consumption of the pulverizers, and makes, its handling after pulverizing a positive instead of a doubtful operation. Damp pulverized material is one of the most refractory substances there is to handle, hanging up and blocking at every point possible, and its transportation is unreliable and a continuous annoyance. When dried, the fuel

Presented at a joint meeting of the Cleveland Engineering society and the Cleveland sections of the American Society of Heating and Ventilating Engineers and The American Society of Mechanical Engineers, Cleveland. The author, H. S. Barnhurst, is advisory engineer, Fuller-Lehigh Co., Fullerton, Pa.

Equipment Used Afloat, Ashore

New Type of Rotary Pump Is Efficient—Designed With Care

BY FRANCIS JURASCHEK

THE striking difference between theory and practice is nowhere more aptly shown than in the development of the present day faulty and inefficient rotary pump from the high ideal of theoretical design. As most engineers know, rotary pumps are not new, and the number of those now on the market possessed of limited rotational speed, low suction lift and small endurance, is large.

The fault may lie, in all probability, not in the inherent difficulties of constructing ideal apparatus out of stubborn and oft-times intractable raw materials, but rather in not holding that construction to a sufficiently high ideal.

Paradoxical as this may seem, it is essentially true. The mechanical engineer who stops to compromise, has lost his battle. And the difficulties in the way of efficient rotary pump design have been great enough to cause many an engineer to compromise.

What are the essential qualifications of the ideal rotary pump? Assuming an all-purpose pump, these six factors suggest themselves:

1. Ability to operate at high rotational speeds without noise or vibration.
2. Ability to pump equally well regardless of direction of rotation.
3. Freedom from the necessity of internal lubrication.
4. Freedom from packing troubles.
5. Good suction lift (say 20 feet or more).

The author is connected with the American Machine & Foundry Co., Brooklyn, N. Y.

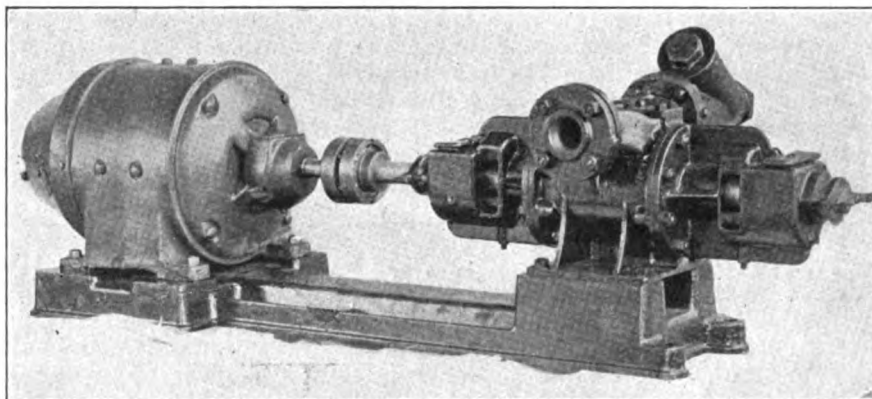


FIG. 1—GENERAL VIEW OF A NEW 2½-INCH, 83-GALLON-PER-MINUTE ROTARY PUMP DIRECT CONNECTED TO A COMMERCIAL HIGH-SPEED MOTOR

6. Life of several years under adverse conditions.

A brief examination of these points reveals the weakness of the ordinary run of rotary pumps. High speed operation is desirable not only because of the greater capacity developed in comparison with a low speed pump of equal size and weight, but also because of the avoidance of speed reducing devices when the pump is driven by a commercial high speed motor. Size for size, and consequently cost for cost (for both the initial cost and the operating cost of a pump are governed by the size) the high speed pump is immensely superior to the low speed pump.

But the direct-connection of a rotary pump to a standard electric motor, and the successful operation of such a unit, introduces many technical difficulties before which designers

have quailed. The high rotational speed of such a motor, about 1800 revolutions per minute, calls for the unusual and the unique in rotary pump design. There must be static and dynamic balance of a high order, and free running fit of part to moving part. Any engineer who has tried out the usual rotary pump, designed for operation at 400 to 600 revolutions per minute, directly connected to an electric motor, will have vivid recollections of the results. Great racket, destructive vibration, opened clearances, heated bearings, and almost total loss of volumetric and mechanical efficiencies, occur regularly.

Regarding the ability of the ideal rotary pump to pump equally well regardless of the direction of rotation, it would seem obvious that this must follow as the natural result of any

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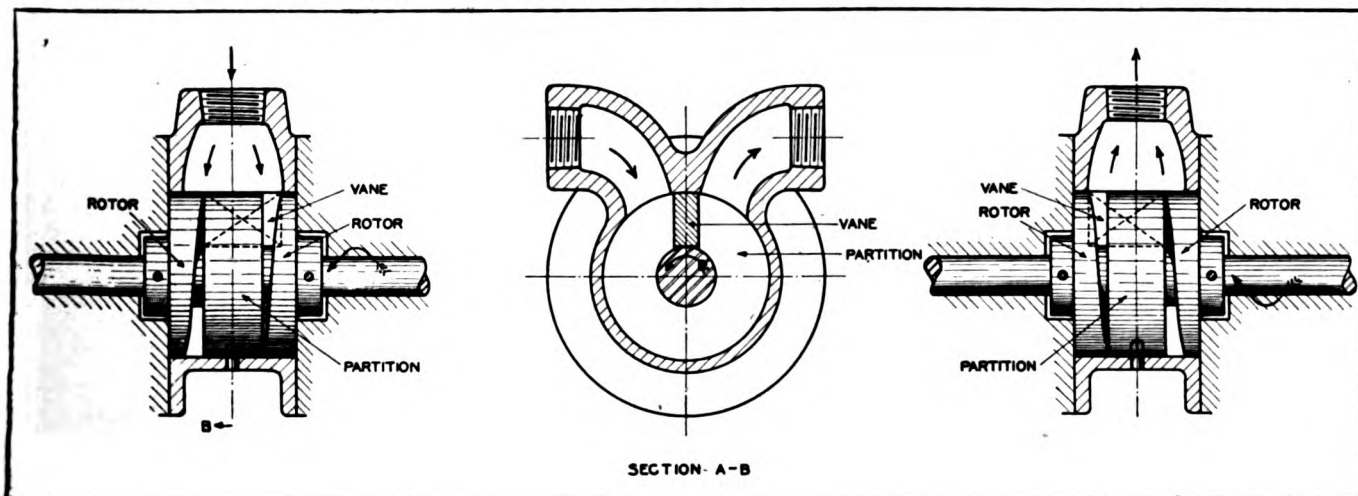


FIG. 2—DIAGRAMMATIC VIEWS OF THE NEW 2½-INCH, 83-GALLON-PER-MINUTE ROTARY PUMP OF THE AMERICAN MACHINE AND FOUNDRY CO.

Pulverized Coal

(Continued from Page 28)

there may be times when the coal will be sufficiently dry before entering the drier. In this case the coal is passed through the drier as usual, but the hot gases are eliminated.

The coal discharging from the rotary drier is received by an elevator, and the spout leading from the drier to the elevator is usually equipped with a magnetic separator for the purpose of removing any "tramp" iron that may be in the coal. Tramp

ning in a dust-tight, sand-sealed trough, the elevator and conveyor usually being driven by the same motor.

The bins above the pulverizers should be big enough to supply the mills for two or three hours, thus permitting a steady feed and allowing some leeway in case anything happens to the drier or elevator drives.

The pulverizing is done in various types of mills, but the most satisfactory and economical results are obtained with heavy ring-type mills, in which the pulverizing elements are forced against the ring by centrifugal

numerous motor drives, since the distance over which one flight can be operated is limited.

Another conveying system consists of a pressure-tight tank, a source of compressed air, and a pipe line leading from the bottom of the tank to the destination. In operation the tank is nearly filled with pulverized coal, sealed, and compressed air is then admitted above the coal, which forces the latter through the pipe line, discharging from the line into the furnace bins. In this system of coal transporting the disadvantages

The Greatest Dry Land Sailor of His Time

By John C. Acker

PETER VENNEMA, druggist of Menominee, Mich., has the blood of sailors in his veins and though he has never been to sea, yet the sea is the romance of his life. His father sailed out of Amsterdam before he emigrated to Holland, Mich., in 1848, one of the original Dutch settlers. Peter was born 50 years ago. His early ambition to go to sea was thwarted by his father. While he has never been a sailor he is an intense and thorough student of all maritime affairs. He knows the captain, engineer, or some member of the crew, tonnages, dimensions, power, class, builders, and past and present ownership of all vessels on the Lakes. Seamanship, nautical history and marine bibliography are as familiar to him as the Latin abbreviations on a doctor's prescription. He is a constant reader of *Marine Review*, the illustration showing him reading the October number. At the close of navigation the pharmacy is a great rendezvous for the men from the ships, and then Peter Vennema listens with eagerness and dreams of the life he has missed.



iron usually consists of iron spikes, splice plates, nuts, bolts, pick points, etc., from the mining operation. Sometimes the magnetic separator is installed ahead of the crushers instead of after the drier. It is very essential to keep iron out of the pulverizers, as it increases the cost of repairs and causes delays. These magnetic separators are usually of the lifting type although in some installations the pulley is used.

The elevator used for delivering the dried coal to the bin above the pulverizers is of the chain-and-bucket type, and steel encased to eliminate dusting. In some cases the elevator discharges directly to the bins above the pulverizers. In other cases it discharges into the screw conveyor run-

force. These particular mills take a feed of 1-inch or 1½-inch material and discharge it at the required fineness. Their superiority is based upon the combination of high fineness produced, large capacities, low power consumption, and low maintenance charges.

Transporting Pulverized Coal

When the coal has been pulverized, it must be transported to the point of use. A number of methods are available, the oldest being the spiral screw conveyor, operating in dust-tight steel troughs. This type of conveyor, as it is hard to keep clean, is dangerous unless given proper attention, and requires considerable power, overhead runways, and often

of the screw conveyor are eliminated, but other faults are discovered, these being that more labor is required in the operation, that the coal must be accepted and discharged in batches, and that the large volume of air required makes cyclone dust collectors at the discharge end essential.

A third system, which is rapidly coming to the fore, consists of a pump having as an impeller a high-speed steel worm, which takes the pulverized coal from a hopper and forces it into a pipe line. A small amount of compressed air is admitted into the material just beyond the discharge end of the worm, and the mixture of air and coal is forced through the pipe line to the destination. The worm is

(Continued on Page 33)

Pulverized Coal

(Continued from Page 30)

specially designed to compact the material as it approaches the discharge end of the pump, and this packing effect serves to prevent the return of compressed air through the worm to the hopper. As a result the pump may be operated with an open hopper as long as an adequate supply of material is received by the hopper, which makes it ideal for transporting the coal from the mill spout to the furnace bin in one operation. The whole system is enclosed, so that there is no opportunity for dusting between the time the coal enters the mill and the time when it is delivered into the bin at the furnace.

The system is also used to take pulverized coal from a storage bin and distribute it to such points as required. A complete electrical signaling system is used to indicate to the operator when the bin to which he is pumping has been filled, and to permit him to operate diverting valves to change the flow to other bins which are in need of coal. The operation is usually made automatic, in order to avoid any chance of overflow.

This system of conveying has been used to elevate pulverized coal over a hundred feet, and to convey it distances of over a mile, the line pressure and the power required, which is comparatively low, depending upon elevation and distance. But little compressed air is required, and hence no cyclone is needed at the point of discharge from the pump line. The material as discharged is completely fluid, and levels off perfectly in the bin, retaining this condition for some time.

In addition to the advantages of

dustlessness, simplicity, and adaptability, the first cost of this system is low and likewise the charges for labor and repairs, and the repairs are easily and expeditiously made.

The cost of preparation of pulverized fuel may be divided into five main items: power, labor, repairs, fuel for drying, and interest and depreciation. Of these, drier fuel might logically be eliminated, inasmuch as its effect is largely returned in increased heating effect of the coal burned under the boilers. Approximately 1 per cent of the total fuel is required for drying, and when waste or steam is available the item disappears. The remaining items decrease as the capacity of the plant increases, and it is this fact which accounts for the commanding position now assumed by pulverized coal in the field of large power plants.

Costs Not Excessive

No set figures can be given for the ratio between these items, as they will vary irregularly with locality and with size of plant, but a maximum of 20 kilowatt-hours per net ton bituminous coal may be stipulated, covering the entire process from crusher to furnace, and the charges for power, labor and repairs may be taken roughly as in the ratio 5:3:2. These three items in a plant having a capacity of 400 tons per day, assuming power available at 1 cent per kilowatt-hour and labor at 50 cents per hour, would amount to 18 cents, 10 cents, and 8 cents, respectively, or a total of 36 cents per ton without financial charges. The actual preparation costs in any particular instance may be readily determined, and a large amount of published data give complete costs under operating conditions.

weight tons, 1991 gross tons, for \$38,000 to John George Murphy, North Ann street, Mobile, Ala.

BALLENAS, steel ocean-going coal-burning tug, 437 gross tons, for \$42,000 to W. E. Hedger Co., Inc., New York.

LAKE GLAUCUS, LAKE GETAWAY, LAKE GALATA, each lake type cargo, 4230, 4155, 4225 deadweight tons respectively, 2686, 2637, 2689 gross tons, respectively, for \$25,000 each, cash consideration and contracts to perform specified alterations and betterments, to Merchants & Miners Transportation Co., Baltimore, Md.

Chairman T. V. O'Connor of the United States shipping board has announced the approval of the sales of the following vessels, subject in some instances to certain preliminary conditions:

LAKE BENTON, lake type cargo, 2875 deadweight tons, built by the American Shipbuilding Co., June 1918, at present laid up at New Orleans, for \$32,000 payable 25 per cent in cash and the balance in five equal annual payments, to the Mobile, Miami & Gulf Steamship Co., Inc., Mobile, Ala.

LAKE PENN, LAKE FANDANGO, LAKE FLAGON and LAKE FARGO, each lake cargo, deep draft oil burners, 4155 deadweight tons each for the first two, and 4145 deadweight tons each for the second two, all four vessels for the sum of \$100,000, to the Charles Nelson Co., San Francisco. These four vessels are laid up in the James river, Va.

MENOMINEE, steel ocean tug, for \$44,100 net cash to the Southern Transportation Co., Philadelphia. This is the third tug purchased by this company from the board. The others were sold for \$50,000 each.

LAKE FIPI, lake cargo, 4050 deadweight tons, deep draft oil burner, built by the Toledo Shipbuilding Co. in September 1919 and at present laid up at New York, for the sum of \$30,000 to the Phelps Bros. & Co., New York city, acting as agents in behalf of Lloyd Triestino Societa di Navigazione a Vapore, Trieste, Italy.

LAKE TREBA, lake cargo, deep draft and oil burning, 4155 deadweight tons, for \$37,000 payable 25 per cent cash, balance in five equal annual installments, to Richard Walsh of Mobile, Ala. Mr. Walsh is interested in the Walsh Stevedoring Co., Mobile.

LAKE GAITHER, lake cargo, deep draft and oil burner, 4225 deadweight tons, built by the Manitowoc Shipbuilding Co. in November 1919, at present laid up in New York, for \$36,000 to the Western Reserve Navigation Co., Cleveland.

General Electric Men Given New Duties

George P. Baldwin, general merchandising manager of the General Electric Co., was elected a vice president of the company at a meeting of the executive committee on Nov. 20. In his new position, Mr. Baldwin will have charge of activities connected with the electrification of steam railroads and such other duties as may be assigned by the president. His new headquarters will be at 120 Broadway, New York City.

Charles E. Patterson, vice president in charge of finance since 1920, will take charge of all merchandising activities of the company, including the supervision of company supply-houses. He will make his headquarters at Bridgeport, Conn. The accounting department responsibilities of Mr. Patterson will be assumed by the comptroller, S. L. Whitestone.

Mr. Baldwin, a native of California, was born in San Francisco, Jan. 22, 1874. He graduated from Leland

(Continued on Page 62)

Recent Sales of Ships

The president of the Fleet corporation has announced the consummation of the following sales of tonnage:

HEGIRA, ocean cargo vessel, 11,600 deadweight tons, 7800 gross tons, for \$250,000, to the Hegira Steamship Co., Tacoma, Wash. The Hegira Steamship Co. is a subsidiary of the Weyerhaeuser Timber Co.

LAKE CHELAN, lake type cargo, 2942 deadweight tons, 2010 gross tons, for \$33,000 to the Consolidated Navigation Co., Baltimore, Md.

LAKE HELEN, lake type cargo, 2989 deadweight tons, 1998 gross tons, for \$28,000 to the Consolidated Navigation Co., Baltimore, Md.

COQUINA, lake type cargo, 3180 deadweight tons, 2140 gross tons.

CORSICANA, lake type cargo, 3303 deadweight tons, 2146 gross tons.

The two foregoing ships were sold for \$25,000 each, cash consideration and contracts

to perform specified alterations or betterments, Pillsbury & Curtis, San Francisco.

LAKE FASYAN, LAKE FERNANDO, lake type cargo, 4155 deadweight tons, 2594 gross tons, for \$26,000 each, cash consideration and contract to perform certain alterations and betterments, to the Munson Steamship Line, New York.

BAYMEAD, BARRALLTON, BATHULUM, BARLOW, BALLCAMP, HUMRICK and BUTTERCUP, all steel ocean going coal-burning tugs, between 418 and 426 gross tons, for \$42,500 each, to the Ford Motor Co., Detroit.

LAKE FEODORA and LAKE FALUN, lake type cargo, of 4155 deadweight tons and 2952 and 2606 gross tons respectively, for \$25,000 each, to the Eastern Steamship Line, Inc., Boston. Besides the cash consideration there are contracts to carry out specified alterations and betterments.

LAKE GILTEDGE, lake type cargo, 4155 deadweight tons, 2664 gross tons, for \$35,000 to R. Walsh c/o Walsh Stevedoring Co., Mobile, Ala.

LAKE INDIAN, lake type cargo, 3015 dead-

What the British Are Doing

Short Surveys of Important Activities in Maritime
Centers of Island Empire

THE Clyde output for the ten months ended October consisted of 186 vessels of 471,018 tons as compared with 185 vessels of 459,761 tons in the same period of last year, and 218 vessels of 559,834 tons in the corresponding period of 1913, which had the highest output on record for the ten months. There was an increase therefore last year of one vessel and 11,257 tons, but a decrease as compared with the best year on record of 32 vessels and 88,816 tons. The total is the seventh best on record for the period and considerably higher than the average of recent years. The position, however, is much less satisfactory than it appears as the shipyards have now very few vessels on the stocks. Some yards are empty, others are employed on their last vessels and only three or four have anything like a moderate amount of work on hand.

* * *

J DENHOLM, president of the chamber of shipping in the United Kingdom, who was the guest of honor at a luncheon given by the American

chamber of commerce in London, said that by the restriction of emigration and other laws, Americans had done a great deal to hamper the British shipowner. But if America would take up the economic side and join with Britain in connection with the question of the league of nations they could do a great deal to assist the general trade of the world.

* * *

THE FURNESS SHIPBUILDING CO. Ltd., of Habberton Hill-on-Tees have launched the twin screw motor ship Athel Prince, the first of two vessels building for the British Molasses Co. Ltd. for their Java service. The vessel is a tanker of a bridge and forecastle type, built on the longitudinal system of framing to Lloyd's highest class for carrying petroleum in bulk. The arrangement of the tanks and the spacing of the bulkheads and scantlings have been specially designed to suit the heavy nature of the molasses cargo. The principal dimensions are: length 488 feet, beam 62 feet three inches, depth 35 feet four inches with a dead weight of 12,500

tons. The builders multiple drilling system has been adopted in the construction. The propelling machinery has been supplied by John Kincaid & Co. Ltd. of Greenock and consists of two sets of single acting Burmeister and Wain deisel engines, a complete oil burning installation is also supplied.

* * *

AT THE Bristol channel ports a new system of employment has been adopted in consultation with the boilermakers' society for repair work. The effect is to remove many of the restrictions imposed by the trade union so that whenever a new job turns up those men who have been longest out of employment will be first to be employed. Men over 60 years of age will be allowed to choose whether or not they will work on an awkward job, say underneath a steamer. If they decline the work they will still be allowed to remain at the top of the rota until suitable work comes along. No boilers are made at any of the yards in South Wales for steamships but repair work finds occasional employment.

What's Doing Around The Lakes

COAST guard stations at Chicago, ordinarily closed during January and February, will be kept open this year. Rum running and thwarting operations are responsible for this order to Capt. J. O. Anderson.

* * *

THE KRAFT SHIP YARD AND DRY DOCK CO., at South Chicago, is converting the barge CONSTRUCTION of the Pringle Barge Line into a self-unloader. Diesel electric drive to operate the unloading machinery is being installed.

* * *

THE GOODRICH TRANSIT CO. on Dec. 15 completed the south-bound movement of approximately 3000 Mexicans from Muskegon, Mich., to Chicago. Last spring the Mexicans came north to work in the Michi-

gan sugar beet fields and were transported from Chicago to Muskegon. The 10 days the ALABAMA was on this service the regular run between Chicago and Muskegon was made by the PURITAN, which was chartered from the Michigan Transit Co.

* * *

THE heavy hand laid by the La-Follette act upon lake shipping is evidenced by the ALABAMA. In summer she is permitted to carry 1500 passengers. In winter, after additional life-saving equipment has been installed, her passenger list is cut down to 350.

* * *

FREIGHT business between Chicago and Lake Michigan ports is holding up unusually well and an average of 70 to 75 per cent of cargo space is

taken up. Weather conditions also have been propitious, and the first ice was not encountered in Lake Michigan until the middle of December.

* * *

THE AMERICAN SAND & GRAVEL CO., Chicago, has sold the sand steamer HYDRO to the Kelley Island Lime & Transport Co., Cleveland. It is understood the HYDRO, which was delivered Dec. 5, will work out of Sandusky, O.

* * *

EDWARD J. FUCIK, since 1908 with the Great Lakes Dredge & Dock Co., Chicago, and since 1922 a vice president, has resigned to become vice president and a director of the Fitz Simmons & Connell Dredge & Dock Co., Chicago.

Freight Handling Costs

(Continued from Page 27)

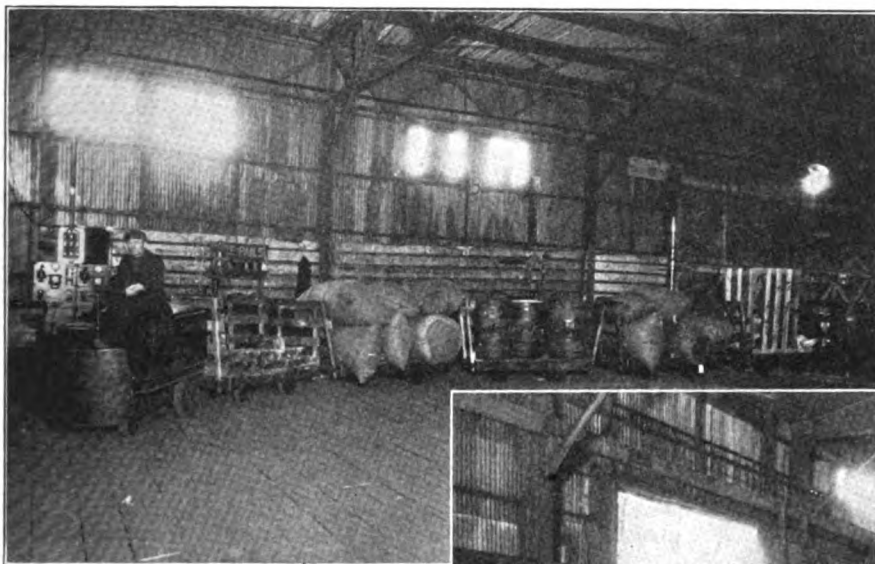
heavy crated machinery and the like. Three classifications are made "Albany" "Delaware & Hudson off of Albany" and "Troy". Separate trains of trailers are made upon this division but in loading no effort is made to keep together single consignments consisting of several pieces. As soon as a train is made up by a man whose job it is to do this and nothing else, a tractor driver takes hold and moves the trailers directly onto the boat. There

but at that point seasonal high and low water creates the most telling variation in the grade of the ramp leading from dock level to the boat. Probably at no points are the advantages of power handling equipment over the hand truck more pronounced than in working freight either on the boat or off against a grade. At Albany, for instance, where there is always a grade of 6 per cent or more, a river man who has watched the development of the tractor trailer method from its infancy recently stated that 'thirty men would be

between 6 and 9 o'clock in the morning. Both tractors are kept rushing during this period. Freight off the boat is classified by consignment in sections marked A to Z at the north end of the dock, where it is stored free of charge for 72 hours. Delaware and Hudson shipments are transferred directly to cars. Frequently 36 cars are loaded and an equal number unloaded in a day.

Tractors Assist Hand Truckers

The performance of the tractors at Albany as far as actual transfer work is concerned is much the same as at New York except that hauls are longer because of the long dock. At extreme low water there are times when both of the tractors are used in pulling up heavy trailer trains. Again the handling of heavy machinery is frequently accelerated by using the tractors to snake it into place. When hand trucks are used the tractor frequently 'stands by' at the gang plank to give the truckers a lift up the grade. The last job of the day at all three points is pulling in the gang-



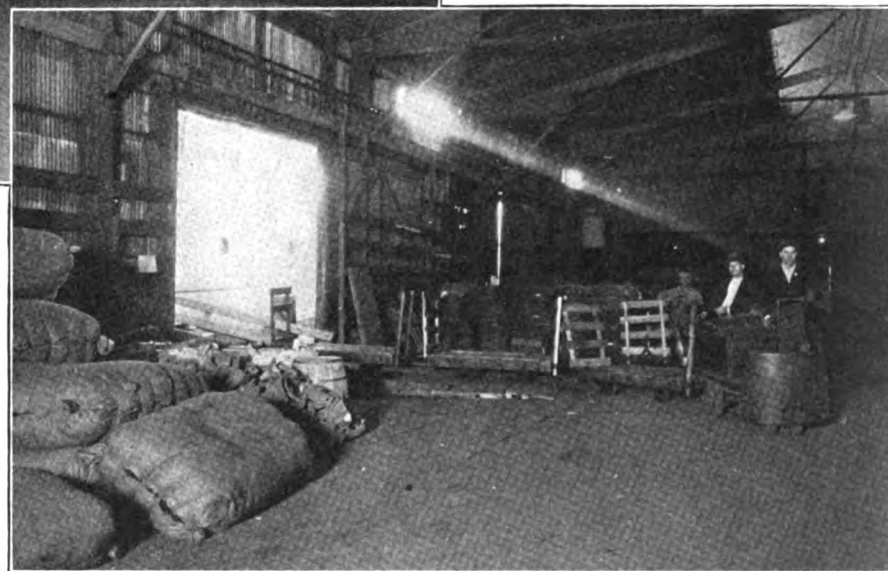
TRAIN STARTING FROM RECEIVING BULK-HEAD FOR SHIP ALONGSIDE DOCK AT FARTHER END

the trailers may or may not be unloaded depending upon the size and shape of the merchandise carried. Heavy pieces as well as small packages are ordinarily shipped on trailers to eliminate needless rehandling. Packages of medium weight that can readily be handled by one man are ordinarily taken off and stowed.

In unloading at New York this procedure is exactly reversed. Hand truckers take out shipments that are to be stored on the pier near the gangway. Trailers on board are usually moved directly to a storage area where the load remains until called for by consignee. Shipments that are to be moved a considerable distance up the pier are loaded onto trailers in the boat and are moved to point of storage in train.

Volume Handled Runs High

Approximately 1300 tons of miscellaneous cargo is ordinarily handled on every working day at the New York pier; about 1000 tons passes over the Albany dock while at Troy 300 tons represents a day's average. The tide is felt as far north as Troy



EMPTY TRAIN LEAVING THE SHIP AT THE FORWARD GANGPLANK

required to do what our two tractors are regularly doing.'

The dock at Albany is long (1400 feet) and narrow (40 feet) being situated alongside the river. This arrangement is obviously not ideal from the point of view of economical handling by manual methods. On the other hand the physical conditions to be met are such that no other layout is possible. An 18 car siding of the Delaware and Hudson railroad has been provided adjacent to the pier to facilitate handling of the large amount of freight that either originates on this line or is consigned to points thereon.

The up-boat is usually unloaded

planks-apparently a strenuous undertaking but very simply accomplished by the mechanical mule.

The Troy dock of the company, while handling less freight is probably better laid out for the work to be done than either of the other two. Two ramps, each about 40 feet long, with an average drop in that distance of 12 feet run from the dock down to each of two gangways that are worked. The dock proper is 150 feet long and 200 feet wide. In building this dock levels were arranged so that there would be a drop of one foot, either from the front or from the back of the dock to

(Continued on Page 48)

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

A CARRIER of goods by water, like a carrier by land, is an insurer and, although no actual blame is imputable to it, is absolutely liable, in the absence of a special contract or statute limiting its liability, for all damages sustained by the goods intrusted to its care, unless the damage is occasioned by the act of God, the public enemy, the public authority, the fault of the shipper, or the inherent nature of the thing shipped. The law however, recognized the right of the carrier to limit in many particulars its common-law liability by special agreement or stipulations in the bill of lading. But in America it was established that a common carrier by sea could not so exempt itself from liability to the owner of cargo for damage arising from the negligence of the master or crew of the vessel. To meet the ever increasing attempts further to limit the liability of the vessel and her owners by inserting in bills of lading stipulations against losses arising from unseaworthiness, bad stowage, negligence, and other causes of liability by which the common-law responsibility of carriers by sea was being frittered away the Harter act was passed. It was designed to fix the relations between the cargo and the vessel and to prohibit contracts restricting the liability of the vessel in certain particulars. — WILLDOMINO, 300 *Federal Reporter* 5.

U NDER section 3 of the Harter act, to entitle a shipowner to exemption from liability for losses to cargo through fault or error in management of navigation of the vessel, he has the burden of proving that he exercised due diligence to make the vessel seaworthy and properly manned, equipped, and supplied, without regard to whether or not there was any casual connection between the lack of such diligence and the loss. Where the voyage on which a shipment is made is not continuous, but divided into stages, the requirement of said section 3 that the owner must have exercised due diligence to make the ship seaworthy to entitle him to exemption from liability for loss or damage, applies at the beginning of each stage of the voyage. — WILLDOMINO, 300 *Federal Reporter* 5.

M UTUAL exception in a charter party of "act of God, restraint of princes, * * * and all and every other unavoidable hindrances which may prevent the loading and delivery," does not apply to a hindrance caused by occupation of berths by other ships ahead, it was held in the

case of *LAKE YELVERTON*, 300 *Federal Reporter* 47; and where the provisions of the charter party for lay days and demurrage speak in terms of days in computing demurrage a fraction of a day is to be counted as a whole day.

D OUBLE towage rate was adequate compensation for salvage services rendered by a tug to a stranded oil barge, which was in protected waters and not in much danger, and there was no danger to the tug. Barges in tow, which were anchored while the tug went out to the aid of the stranded vessel, which rendered no service and were not delayed because of the salvage service, were not entitled to salvage award. — *Holbrook v. Freeport Sulphur Transportation Co.*, 300 *Federal Reporter* 63.

T HE equipment of vessels, whether used in harbors or on the high seas, it was said in the case of *HEADLIGHT*, 300 *Federal Reporter* 84, is regulated either by tradition or statute, and in the absence of usage or statute requiring the master of a harbor tug to carry a barometer, the court cannot charge him with fault because of his failure to do so. The court also held that it is the duty of the master of a harbor tug to note and give weight to the warnings of the weather bureau as publicly displayed, but he is under no duty, nor is the operator of a number of tugs, to apply to the bureau for private opinions or unpublished information about the weather to come.

T HE owner of the pier and in exclusive control of the coaling of the boat, owed the duty of exercising that degree of care reasonable required to load the coal so that no damage would ensue to the vessel. If it failed in this respect, and its failure was the proximate cause of the damage, it should be held liable. On the other hand, and equally, the owner of the vessel to be coaled owed the duty of furnishing a seaworthy vessel, so that in the operation of coaling, if done in the exercise of ordinary prudence, no damage would ensue. — *BARRENFORK*, 300 *Federal Reporter* 366.

U NDER section 3 of the Harter act and a bill of lading exonerating a ship for damage to cargo due to assisting another vessel in distress, a salvor vessel is not liable to a cargo owner for damage caused by delay due to salvage service, and the salvaged vessel cannot be held liable to

the cargo owner on the salvor vessel for delay. — *MENOMINEE*, 300 *Federal Reporter* 461.

W HILE salvage includes many demands "in the nature of salvage," a vessel in distress cannot be made to respond, either for strict salvage or services in the nature of salvage, unless it be proven that the person making the claim rendered services and that such services benefited the vessel in trouble; as cargo on the salvor vessel did not aid the salvaged vessel, the cargo owner was not entitled to damages from the salvaged vessel for delay. — *MENOMINEE*, 300 *Federal Reporter* 464.

A N INJURED seaman assumes the risk of injury from any and all those dangers ordinarily and naturally incident to the service, but not to the full extent of the doctrine of assumption of risk as applied to employees on land, because of the difference in conditions, his inability to quit the service, and his subjection to disciplinary and summary punishment for disobedience of orders, it was said in the case of *Grimberg v. Admiral Oriental Steamship Line*, 300 *Federal Reporter* 619. A seaman does not assume the risk of injury resulting from unseaworthiness of the vessel, defective appliances, or a place to work not made reasonably safe, though he continues in the employment with knowledge of the danger, nor from the negligence of an officer of the ship, or other member of the crew. It was also held that a watchman, a member of the crew during the voyage, is a "seaman," within section 33 of the merchant marine act.

I T WAS the duty of the charterer of a barge, as bailee, to have shifting tugs available to move the barge moored in an exposed position to a safe place, to prevent damage from a long-continued and increasing gale; where a charter party contains no covenant for return of the vessel in good order, there is no liability for injury to the vessel without negligence. — *Empire Brick & Supply Co. v. Hines*, 300 *Federal Reporter* 683.

I N DETERMINING liability for damage to a tow, known wrecks must be treated like known, but uncharted rocks, and a competent navigator is held to the duty of keeping his vessel and her tow from running into them, and the only excuse for failure is his maior. — *McWilliams Bros., Inc. v. Pennsylvania Railroad Co.*, 300 *Federal Reporter* 687.

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Each year more shipping lines are overcoming steam and power losses by specifying Lockwood & Carlisle packing, exclusively.

Due to construction, ring tightness and efficiency remain constant.

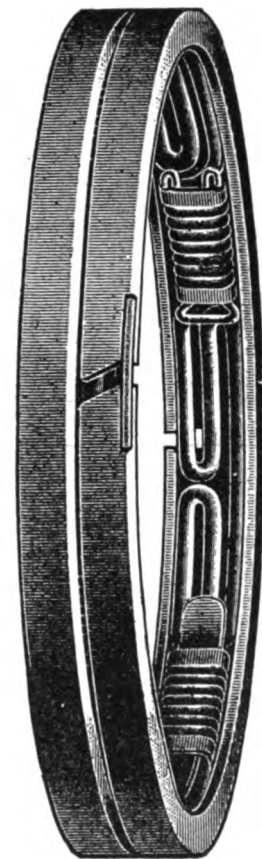
In the process of manufacture we start right; special metal only used in our rings and springs.

Spring design, the result of twenty years experience, insures correct ring pressure on piston flanges and cylinder walls.

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95 Liberty Street
New York



Please mention MARINE REVIEW when writing to Advertisers

Cut Costs-Conserve Fuel

(Continued from Page 22)

are sufficiently competent to continue to handle the Fleet corporation vessels.

In order to get the best results from this competition, by directing the efforts of the personnel toward such channels as will produce the most economic results, it has been considered advisable that the engineers be given training in one of the most important phases affecting efficient operation, namely, boiler performance. To this end, a fuel oil school has been established through the courtesy of the United States navy at the Philadelphia navy yard, fuel oil testing plant, where a short, intensive course of instruction is given in the principles and practice

class of vessels in our fleet bring out the difference in results obtained on vessels fitted with the identical equipment but manned by crews of varying grades of personal efficiency. This is one of the greatest values of the standards, as it so often shows plainly which are the better manned vessels. However, care must be taken in passing judgment on the personnel efficiency based on this ratio alone, as foulness of bottom, weather conditions, inferior grade of fuel, hidden defects in equipment or some other factor beyond control of the operating personnel may cause a poor performance. When such a performance is shown, careful analysis of voyage report must be made to determine just where the trouble lies. It has been our experience, in about 85 per cent of the cases that the trouble lies with

changed, as we have not found sufficient improvement in economy to justify it.

The rigid connections between oil supply lines and burners have been replaced by flexible connections, so that regulation of burner setting can be effected to take care of variance in spray angle, caused by slight wearing of tips and atomizing chambers, and also by changes in draft conditions. A uniform type of burner ring installation has been adopted. It is V-shaped periphery type which gives a more intimate mixture of atomized fuel with the air, necessary for combustion, as the cone of atomized oil can easily be brought to an approximate point of tangency with this burner ring opening, and the incoming air is directed at approximately right angles to the atomized oil.

Determine Smoke and Viscosity

Smoke detectors have been installed, which consist simply of a beam of light thrown across the last pass of the gases and reflected by mirrors similar to periscope installation, so as to be visible from the floor plates, the intensity of this light being such that, with a smoke-free breeching, the reflected light disk will be bright yellow, and with No. 1, Ringelmann smoke the light will be cut off entirely. Between these two extremes, wisps of smoke will cut across the path of the light beam, producing a pulsating effect on the light disk. This will indicate from 0.25 to 0.5 Ringelmann smoke. By checking the conditions noted with the flue gas analysis, it is determined at just what rate of pulsation the best combustion is produced. This simple apparatus we have found to be one of the most satisfactory guides for combustion control.

Use of the viscosimeter for the predetermination of temperature required for obtaining the viscosity at which the fuel oil can best be pumped and atomized resulted in the elimination of the cut-and-try methods which the operating personnel would otherwise have to follow in determining these values.

In the case of our coal burners, grates have been modified so that the full length of fire could be easily worked and thereby prevent the air holes in the rear end of the fuel bed so common on the former excessively long grate bars. This has resulted in an increased fuel per square foot of grate surface rate, but it has been found that so long as this rate is kept down to 30 pounds per square foot per hour, the draft condition

TABLE I

TABULATION OF SEA PERFORMANCES

9600 D. W. T.—TURBINE DRIVEN—OIL BURNING—CARGO VESSELS.

Name of vessel	PERFORMANCE 1922						PERFORMANCE 1924					
	—Fuel oil consumption—						—Fuel oil consumption—					
	R.P.M.	Obs.	Tons per 24 hours	Obs.	per mile	Efficiency	R.P.M.	Obs.	Tons per 24 hours	Obs.	per mile	Efficiency
Braddock.....	86.8	10.22	32.41	296.1	7.56	82.6	88.0	10.86	24.99	215.1	10.42	117.0
Duquesne.....	85.7	11.12	27.84	233.7	9.59	104.5	88.6	11.38	28.38	232.9	9.62	110.7
Federal.....	88.6	10.68	26.47	232.4	9.68	98.5	88.0	10.66	31.42	277.2	8.08	86.5
Homestead.....	86.7	10.75	29.28	254.2	8.81	92.3	86.5	9.70	28.10	269.5	8.32	79.1
Jeff Davis.....	83.5	9.76	29.56	282.7	7.92	77.6	89.0	10.08	29.04	267.8	8.37	90.5
Liberty.....	80.8	9.04	31.70	327.3	6.84	61.4	88.2	10.57	27.05	238.6	9.38	96.0
McKeesport.....	87.4	10.71	27.64	240.9	9.30	98.1	91.1	10.42	24.01	214.8	10.42	126.4
The Lambs.....	86.1	10.82	28.14	242.7	9.22	92.0	87.8	10.51	29.30	260.0	8.62	91.0
Vincent.....	88.6	10.63	32.59	286.1	7.83	86.1	87.8	11.14	27.72	232.1	9.65	112.6
Youngstown.....	83.4	10.02	28.58	266.2	8.41	89.6	84.6	10.30	26.76	242.4	9.24	100.0
Waukegan.....	87.5	8.22	26.79	304.4	7.36	88.5	91.6	11.54	27.20	220.6	10.15	119.1
Average all ships.....	85.9	10.18	29.19	268.0	8.39	88.3	88.0	10.65	27.62	242.5	9.26	102.6

S. C. No. 19.
Design No. 1037.
Built by Federal Shipbuilding Corp.

of combustion and the methods of attacking the problem of boiler efficiency in a logical and intelligent manner so as to obtain maximum results. During the past two years over 600 American merchant marine engineer officers have attended this school. The benefits derived from this training have been so satisfactory that, in response to requests made by west coast operators, a similar school has recently been established at Mare Island navy yard, where approximately 100 engineer officers up to date have had this training.

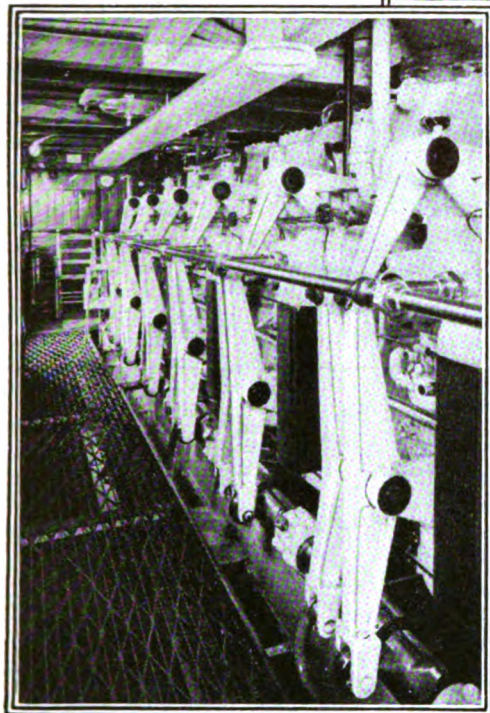
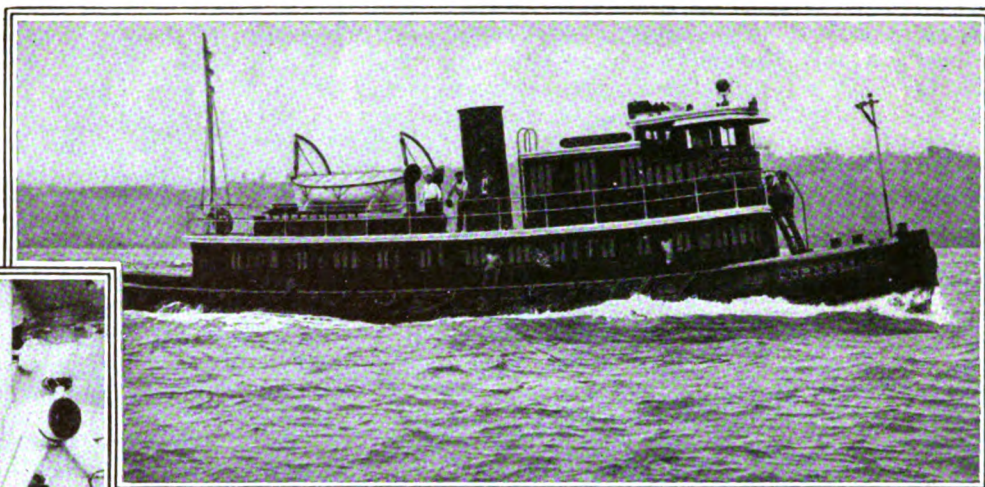
Efficient Personnel Important

The two factors which will affect the efficiency of operation are material and personnel, and, when once the ship has been built and is in service, the latter factor becomes by far the more important. Comparisons made on the basis of ratio of actual fuel performance to those given by the standards for any particular

the operating personnel, and our greatest efforts have been directed toward pointing out where waste exists, which the operating personnel itself must correct.

Some changes have been made in the material to facilitate better operation, such as substitution of natural draft oil burner register in lieu of the combined coal and oil fronts with which so many of our vessels were fitted out during the period of war construction. The combined coal and oil natural draft front can be made to function satisfactorily, but, with the air regulation by means of ash pit and fire doors, it is difficult to maintain a high combustion efficiency under varying atmospheric conditions. To eliminate this difficulty, natural draft registers having a readily adjustable air admission, which permits close-regulation of air for combustion, have been installed. The combined coal and oil fronts operating under forced draft, such as the Howden system, have not been

Tugboat "Cornell" powered with a 330 S. H. P., 6-cylinder Nelseco Diesel engine... owned by the Cornell Steamship Company, New York City.



First tugboat equipped with Diesel-gear reduction drive

LAST March the steam tug, "Cornell" was rebuilt for Diesel engine installation at the Kingston Works of the Cornell Steamboat Co. There she was fitted with a 330 H. P. Nelseco Diesel engine and a Reduction and Reverse Gear interposed between engine and propeller. Since that time she has been in continuous 24-hour daily operation, handling all types of harbor work without delay... and with a substantial saving in operating costs.

So successful has been the operation of the "Cornell" that the owners are now converting a duplicate tugboat to Nelseco Diesel power with gear reduction.

This is only one of the many successful Nelseco Diesel installations that have been made in the past few years.

Don't postpone the conversion of your vessels to Diesel power. Let the Nelseco engineers tell you how easily you can reduce operating costs and increase cargo capacity and profits. Nelseco facilities include complete conversion or steel ship building construction.

THE NEW LONDON SHIP & ENGINE CO.
Groton, Conn. U. S. A.

Nelseco Diesels are built under M. A. N. patents; 2- or 4-cycle type; single or double acting; mechanical or air injection; in 4-cycle, single acting type from 100 H. P. to 800 H. P.; in 2-cycle, double-acting type, from 1000 H. P. to 10,000 H. P.; suitable for yachts, tugs, freight and passenger vessels.

A 180 H. P. Nelseco Diesel is conveniently placed for your examination at

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Demonstrations made on appointment

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Original licensees from and collaborators with M. A. N. since 1910

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on our vessels is satisfactory for efficient combustion.

Rear end soot blowers, which reduce the labor required for maintaining clean fire surfaces, have been installed with resultant double effect; first, they keep the tubes clean, and second, they show up leaky smoke box connections which would interfere with the draft and so affect the efficiency of combustion.

Cast-iron ventilated bridge walls have replaced the old-time brick bridge walls, which were broken down after the first few cleanings in endeavoring to break loose the clinkers from them.

Vacuum condition on the turbine-driven vessels has been given special attention, one of the corrective measures being the installation of bifurcated connection from air pump to condenser shell so as to give a connection both sides of the tube support sheet. Another corrective measure is the utilization of excess auxiliary exhaust for heating purposes, which not only effects an improved thermal efficiency but also reduces the load on the condenser.

From this outline of the chief changes that have been made in the equipment, it will be seen that they are of a more or less minor nature, and, of course, all of them never apply to one vessel. All are along the line of accepted engineering practice and have demonstrated that they will pay for themselves in a short time by improved economy of operation.

Methods Employed

The foregoing outlines the methods which have been emphasized in applying the performance standards to the active vessels of the fleet to accomplish fuel conservation and are summarized as follows:

1.—Determination of what is the actual performance by a systematic inspection of vessel and her logs.

2.—Analysis of performance to determine its rating and to locate sources of waste.

3.—Interesting the operating personnel in the efficiency of its performance.

4.—Stimulating a healthy competitive spirit in the operating personnel.

5.—Education of the operating personnel so that it can help itself to produce economical results.

6.—Minor changes in the equipment so as to reduce the variable of the personnel equation in its manipulation for obtaining maximum results.

Results Obtained

The results that have been obtained from applying these methods are best

demonstrated by a visit to the vessels themselves. An inspection of the engine department, a survey of their average work list, and a talk with the engineer officer will show today that, instead of these vessels being just a temporary means of livelihood for the great majority of officers, as was the case only a couple of years ago, they are now vital units of the American merchant marine, the physical condition and the performance of which are matters of considerable concern to the present operating personnel.

Sea Performance

Records show that in 1922 the performance of the Hog Island type of vessels was divided as follows:

2 vessels below 60 per cent rating.

2 vessels between 60 and 70 per cent rating.

mile factor has been reduced 21 pounds.

Port performance

$$\text{Efficiency} = \frac{K_1 \times \text{Hrs. in port} + K_2 \times \text{Tons cargo handled} + K_3 \times \text{Tons fuel bunkered}}{\text{Pounds fuel consumed in port}}$$

For the Hog Island class of vessels these constants are as follows:

K_1 = 250 pounds of oil per hour for ships' use.

K_2 = 7.5 pounds of oil per ton of cargo handled by ships' winches.

K_3 = 3 pounds per ton of fuel bunkered when vessel supplies steam for pumping, plus 0.1 pound per degree temperature rise per ton when vessel supplies steam for heating oil in barge.

Development of fuel economies in port consumption presents several difficulties of somewhat different nature

TABLE II

TABULATION OF PORT PERFORMANCES 9600 D. W. T.—TURBINE DRIVEN—OIL BURNING—CARGO VESSELS

Name of vessel	—PORT PERFORMANCE 1923—			—PORT PERFORMANCE 1924—		
	Fuel oil consumed—Lbs./Hour	Ship's use only	Efficiency	Fuel oil consumed—Lbs./Hour	Ship's use only	Efficiency
Braddock.....	522.4	434.0	64.4	418.2	329.0	81.0
Duquesne.....	392.7	291.0	89.9	475.0	400.0	71.2
Federal.....	562.0	466.0	61.5	744.5	627.0	49.9
Homestead.....	473.7	427.0	62.6	452.0	383.0	70.5
Jeff Davis.....	405.3	297.5	87.8	545.5	456.0	62.4
Liberty.....	859.5	757.0	39.8	546.0	497.0	54.8
McKeesport.....	448.3	394.0	67.9	418.5	255.0	99.0
The Lambs.....	961.0	855.0	37.4	329.0	261.0	96.8
Vincent.....	420.2	345.0	77.4	358.0	280.0	91.8
Youngstown.....	574.0	346.7	61.9	428.1	299.0	88.6
Waukegan.....	421.8	336.0	89.0	378.1	255.0	98.5
Average all ships.....	549.3	449.9	68.1	463.0	316.1	78.7
S. C. No. 19. Design No. 1037. Built by Federal Shipbuilding Corp.						

A paper read before the Society of Naval Architects and Marine Engineers by C. J. Jefferson, head fuel oil conservation section, Emergency Fleet Corp., New York.

20 vessels between 70 and 80 per cent rating.

25 vessels between 80 and 90 per cent rating.

17 vessels between 90 and 100 per cent rating.

2 vessels slightly above the 100 per cent standard.

while in 1924 the performance of these same vessels show:

0 vessels below 70 per cent rating.

4 vessels between 70 and 80 per cent rating.

23 vessels between 80 and 90 per cent rating.

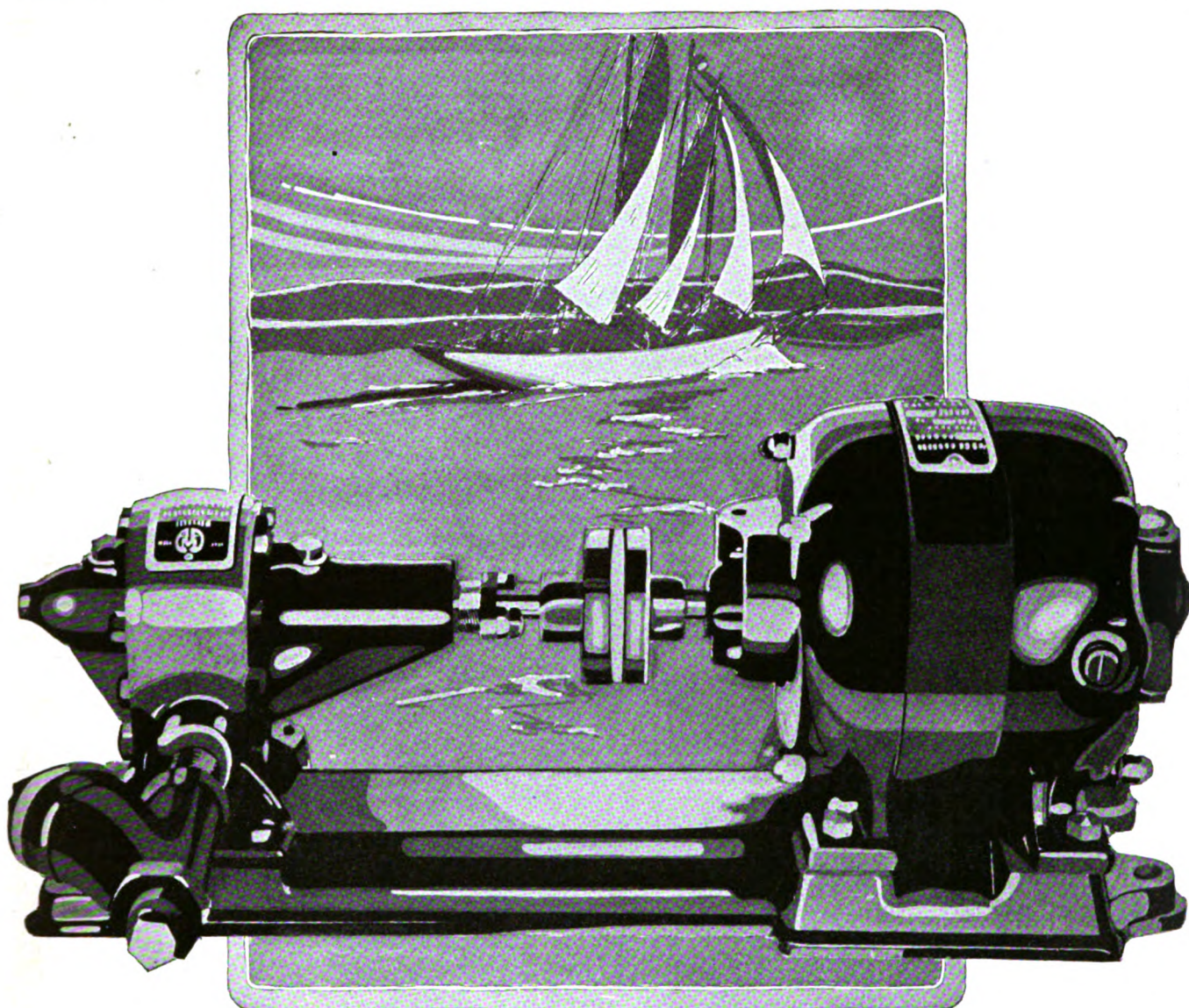
27 vessels between 90 and 100 per cent rating.

14 vessels slightly above the 100 per cent standard.

This table also shows that the average sea performance efficiency of this class has been brought from 83.7 per cent in 1922 up to 92.5 per cent in 1924, that the average speed has been increased 0.15 knot, while the daily consumption has been reduced 1.93 tons and the pounds of fuel per

than those met with in the sea performance. When the vessel arrives in port there is a letdown in the morale of the operating personnel which militates against efficiency. The operation of boilers economically under the reduced load of port service calls for greater attention so as to avoid high excess air conditions with their resultant decreased combustion efficiency. Co-operation between deck and engine departments is most essential so as to prevent unnecessary use of deck steam with its attending losses due to line condensation, and minor leaks. A tendency to charge fuel used at sea to the port consumption so as to give a good sea rating must also be overcome.

The fixing of the constants for port standards was attacked from three angles: (1) Estimated steam consumption; (2) observations made on board vessel in port; (3) analysis of logs of previous performances. The length of stay in port, of course, affects the K_1 constant or pounds of



The ROTARY PUMP that meets Every Emergency

SMOOTH, graceful lines and eager responsiveness to tiller or throttle are the qualities every boat owner most admires in his "ship"—but, is she safely equipped to weather a squall, to ride out a storm, to fight fire or leakage?

Dependable pumping equipment is vital to every ship's welfare.

AMF Rotary All-Purpose Pumps safeguard every type of ship against FIRE—STORM and LEAKAGE. Their direct connection to high speed drive unit assures instant

adaptability for every pumping requirement—bilge—deck-washing or emergency.

SAFE — STURDY — SURE

NO GEARS to wear out.

NO VIBRATION to cause trouble.

MINIMUM OVERHEAD in attention and upkeep.

All-bronze for salt water; **bronze fitted** for fresh water. **Cast Iron** for oil service.

A Type for Every Ship Afloat

American Machine & Foundry Co., Brooklyn, N. Y.



Please mention MARINE REVIEW when writing to Advertisers

fuel per hour for ship's use. A few hours stay with standby conditions will require a considerably greater amount of fuel per hour than will be the case when the vessel is in port several days and is able to get down to true port operation. Therefore the value fixed for K_1 is made to apply to the whole voyage or represents a "multiple port rate." The K_1 , or cargo constant is based on water rate of the winches and the horsepower required to handle the cargo. This horsepower value was determined quite accurately on one of our vessels fitted with electric winches.

The K_1 value is determined by the water rate of pumps and horsepower required to lift the fuel, also by a heat balance applied to the problem of heating the fuel.

At the time port standards were put into effect in 1923, the performance of the vessels was divided as follows:

- 10 vessels below 50 per cent rating.
 - 20 vessels between 50 and 60 per cent rating.
 - 20 vessels between 60 and 70 per cent rating.
 - 10 vessels between 70 and 80 per cent rating.
 - 7 vessels between 80 and 90 per cent rating.
 - 1 vessel between 90 and 100 per cent rating.
- While the last voyage reports for the same vessels show the port performance standards to be:
- 1 vessel below 50 per cent rating.
 - 11 vessels between 50 and 60 per cent rating.
 - 15 vessels between 60 and 70 per cent rating.
 - 24 vessels between 70 and 80 per cent rating.
 - 12 vessels between 80 and 90 per cent rating.
 - 5 vessels between 90 and 100 per cent rating.

It will be seen from this that the average port performance efficiency has been brought up from 62.8 per cent in 1923 to 72.6 per cent in 1924. The total fuel used per hour in port has decreased from 560 pounds in 1923 to 495 pounds in 1924, or 65 pounds. As the cargo handled has increased somewhat, the amount consumed for ship's use after deducting the amount required for bunkering and handling cargo is a better value to use for comparative purposes. This value has been reduced from 471 pounds in 1923 to 396 pounds in 1924, or a saving of 75 pounds per hour for ship's use has been effected.

The average mileage per year for one of the vessels is approximately 50,000 miles, which means that the

80 vessels of this class travel a total of about 4,000,000 miles per year. With the pounds of fuel per mile factor reduced 21 pounds this represents fuel reduction of 37,500 tons in sea consumption, which at the present cost of fuel represents approximately \$400,000 per year. The time spent at sea in traveling 50,000 miles at 10.43 knots amounts to 4794 hours, which leaves 3966 hours in the year for time spent in pilot waters and in port. Approximately 8 per cent of this time is used in pilot waters, so that time actually spent in port duty is about 3600 hours per year. As noted above, the fuel required for other than bunkering and handling cargo purposes in port has been reduced 75 pounds per hour. This, therefore, represents a saving of 120.5 tons per year per vessel. For the fleet of the 80 vessels of this class, this becomes 9640 tons, which, at present fuel prices, represents approximately \$102,000 per year. The combined savings made in sea and port fuel consumption therefore makes a total fuel saving of over \$500,000 for this one class of vessels.

Tables I and II show a tabulation of the same values as that for the Hog Island type for the eleven 9600-ton, D. W. T., turbine-driven, oil-burning vessels built by the Federal Shipbuilding Co. now in active service in our fleet. These tables show an improvement of 14.3 per cent in efficiency of sea performance and 10.6 per cent in efficiency of port performance. The speed has actually been increased 0.47 knot, the fuel per mile factor reduced 25.5 pounds, and the port consumption shows that the fuel required for ship's use has been reduced 138.8 pounds per hour. In those two cases where the inspection report showed decreased efficiency for this class, the difficulty was immediately located as being inefficient personnel, which made it possible for the executives of the company to promptly correct this condition by changing to more competent officers.

Similar tabulations of the other classes of vessels which make up the active fleet show a like proportional saving which, when applied to the larger consumers, such as the 10,000-ton cargo vessels and the passenger vessels, brings the total saving well above the \$2,500,000 mark. In conjunction with this saving, maintenance charges have been reduced, while more reliable and better service has been established.

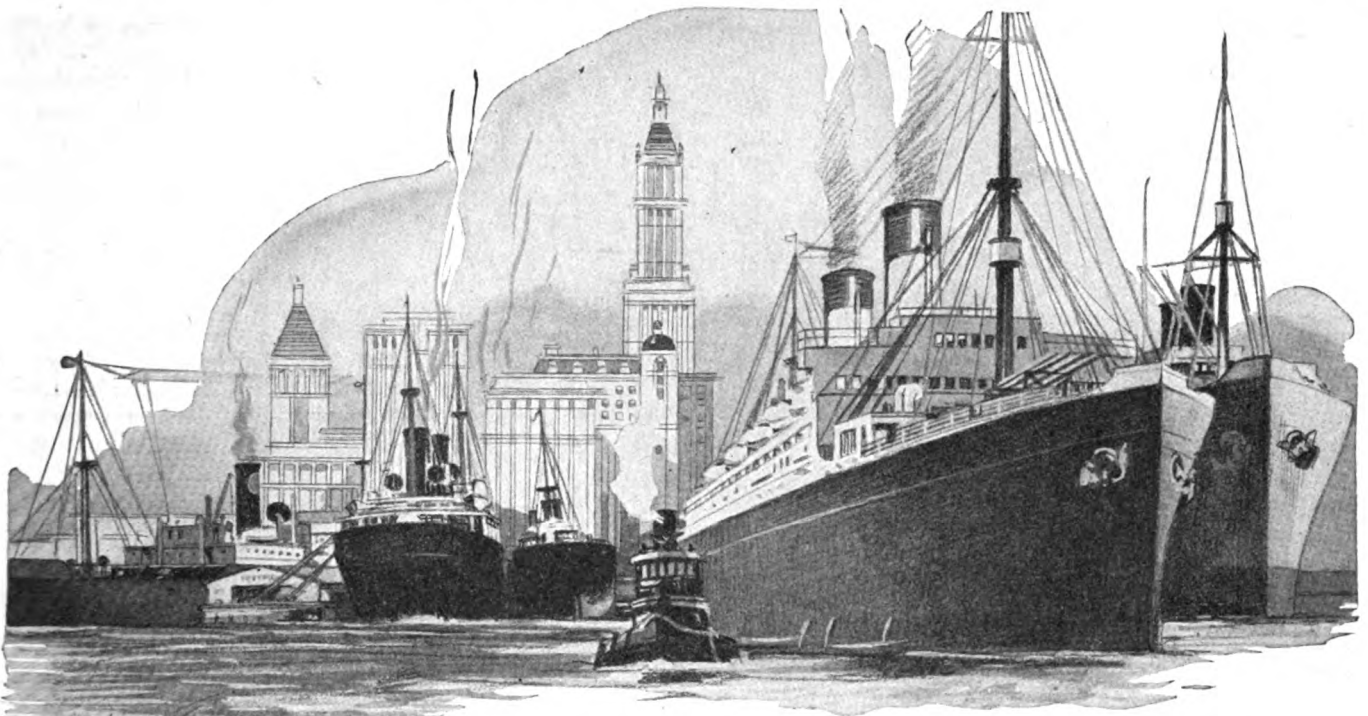
The accompanying chart shows the progressive improvement that has been accomplished in sea performance. Eight vessels of the same class, as

shown on the tabulation, have been selected for this chart. These eight vessels were among the poorer performers of the class and were given especial attention both from the personnel and material point of view. The average efficiency of performance for the six-months period from July 1, 1922, to Jan. 1, 1923; Jan. 1, 1923 to July 1, 1923; July 1, 1923 to Jan. 1, 1924; Jan. 1, 1924 to July 1, 1924, for each of the vessels and the average of the eight have been plotted. It will be noted that in the first six-months period, five of these vessels continued to fall off in their efficiency, while three of them showed a slight improvement. During the second six-months period two of them continued to fall off, while three showed a moderate improvement and three showed a marked improvement. During the third period, one of the vessels which showed a marked improvement in the second period falls off slightly, one holds steady on the marks it has reached, three show continued moderate improvement, while three show marked improvement, the average curve showing:

First 6 months period efficiency increase, 0.8; second 6 months period efficiency increase, 4.4; and third 6 months period efficiency increase, 6.3 per cent. The reason for this increasing increment is due to the time it takes first to get personnel interest in the efficiency of performance, which is shown by the first period. In the case of the especially poor performers this was easily accomplished by showing them their relative rating in comparison to their sister ships.

This chart shows the improvement which has been accomplished on the vessels, where concentrated effort has been made to improve the efficiency of performance by application of the fuel conservation methods and the performance standards.

Variable weather conditions, ocean currents, bottom conditions, are not perhaps absolutely accurately compensated for, but the standards do represent what can be done by the vessel under average conditions and they do permit a simple relative comparison between sister ships and performance of the same ship which stimulates the efforts of the operating personnel to produce maximum results, and they do indicate the trend of the efficiency of performance of the vessel. Thus they are serving as a considerable aid in the reduction of the fuel consumption of our vessels, and as a real and practical criterion of the relative efficiency and attention to detail from an operating standpoint of our managing agents.



A Port Growing Swiftly

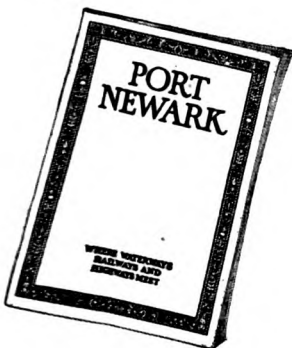
because of the economical advantages which it offers to manufacturer and shippers

THE cargoes which originate in the vast industrial empire of the middle Atlantic and New England States can be distributed to ocean carriers more speedily and economically through Port Newark than through almost any other shipping center on the Atlantic Seaboard.

At Port Newark there is no expensive, time-wasting lighterage or rehandling. The modern, fully-equipped docks all have paved roadways and rail sidings, so that *direct* exchange of cargoes can be made from overland to overseas carrier. Seven trunk line railroads have switching connections with the piers. Storage space—both protected and open—is more abundant than anywhere else on the coast. A sheltered harbor, with a thirty-one-foot channel depth at mean low water, provides safe loading and navigating conditions in all weathers.

As these advantages of Port Newark are becoming better known to the manufacturers and shippers of the east, the volume of business passing over its docks is rapidly increasing. Every month shows a sharp increase in the tonnage handled.

Now is the best time for alert shipping executives to study carefully the trend of development at this great new port within the limits of New York Harbor. Choice warehouse and terminal sites may still be obtained on very attractive terms. For information, write to



Write today for this interesting free book. It tells you about Port Newark and gives important information about the territory contiguous to it.

THOMAS L. RAYMOND, Mayor
Newark **New Jersey**

PORT NEWARK

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Rail to Ship Transfer

(Continued from Page 24)

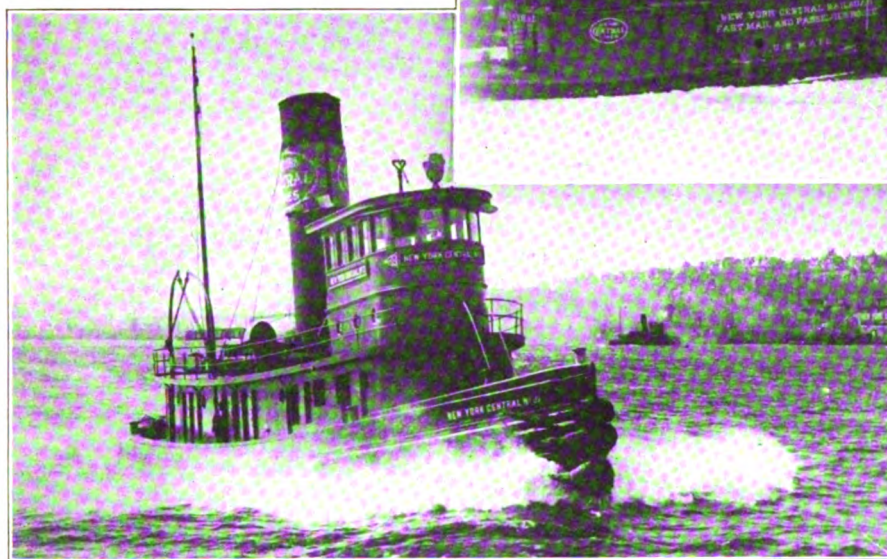
marked change than any other class of harbor equipment. These "ships" from the old slovenly sidewheelers have changed to fast screw boats and make a fine picture as they dart back and forth across the river. Some carry only automobiles and trucks, but the majority are given over to both passenger and vehicle traffic.

As there are no bridges or tunnels (as yet) over or under the Hudson river for vehicle traffic, the ferryboats are called upon to carry all of the New York-New Jersey vehicular transportation. This from a few trucks and one-horse shays has increased to enormous proportions. Fifteen years ago, before automobiles came into common use, there were no delays at the entrance to the ferry, but today cars and trucks line up in some places as much as a mile back from the slip. In rush hours all available saloon space is taken up by passengers and the freeboard of the boats is reduced to a

connection, but where the different railroads are not so connected the cars are loaded on carfloats and towed by tug boats to the destined railroad, where they are taken off the floats. Carfloats are long flat bottom boats divided as between transfer and platform floats. The former have three tracks with two lead tracks at one end and with bumpers on the other ends. These carry about twenty cars of an average load of fifty tons, but this by no means is the limit of their load capacity. Platform floats have an island platform down the center with floor height on a level with the car

The same methods are used in pulling the cars from the floats. The float bridges have an apron of sufficient length to give smooth transition as between land and boat at any stage of the tide, and when the floats are bridged they are fixed to the apron by steel toggles.

Lighter freight comes in on the piers, the rails usually running down the middle to the pier head. Merchandise is either unloaded to the pier or trucked (by hand trucks) direct to the barge to which it is assigned. Some freight is stored in transit on the piers, which are both single story



TUG NO. 31—ONE OF THE BIG TYPE OF TUGS USED FOR FLOAT SERVICE

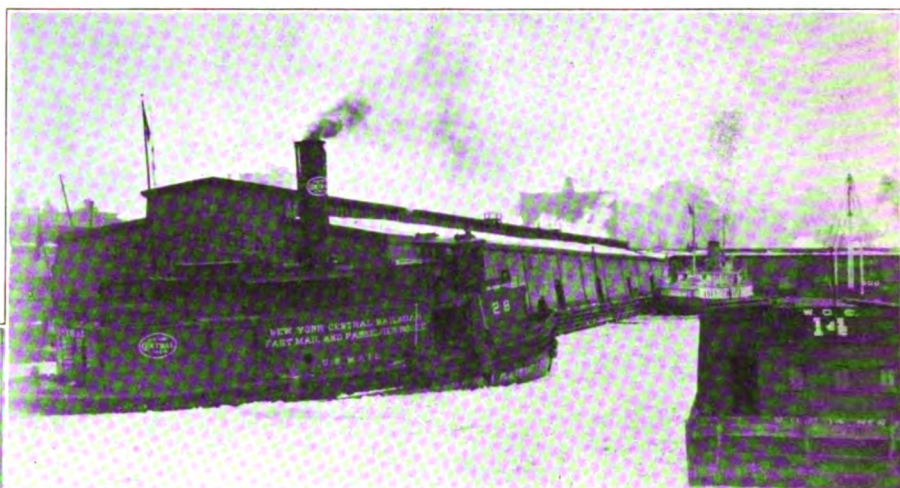
minimum. Most of the passengers carried are either going to or from trains, and boats must be run under five minute headway in rush hours.

Eastbound freight coming to this port by rail makes up over 80 per cent of the total tonnage handled by the railroads. This is for interchange, export and local destinations. Interchange is taken care of by both direct rail connections and by carfloat. Export commodities are taken from rail to ship by covered barges, refrigerator-heater barges, derrick barges and scows. Local deliveries are made with all classes of equipment.

Interchange is carried on all along the New Jersey shore by direct rail

floors and a roof for protection during inclement weather. This class of boat ranges from 150 to 370 feet in length with an 11 foot depth and 40 foot beam, with standard centers for their lead tracks.

Floats handling interchange cars are usually loaded in both directions and where regular interchange is carried on, floats must always be ready to take care of the cars coming into the float terminals. The cars are pushed on floats by switching locomotives to which are coupled light float cars to act as pushers so that cars can be placed at any spot on the float without the locomotive going over the apron of the float bridge.



SELF PROPELLED STEAM LIGHTER—USED FOR SPLIT DELIVERY OF FREIGHT AND FOR TAKING OFF U. S. MAIL

and two story, and are from 500 to 1500 feet long. Storage space on the second floor is used for commodities which are destined to lay for some time. Some merchandise is given free storage for a definite period, whereas other materials are charged storage, this all depending upon the tariff shipped under and the commodity itself. Likewise lighterage is free depending upon the same qualifications. If the merchandise is to be exported the consignee must obtain a permit for loading on a definite ship at a definite time and the railroad upon receipt of this permit is obligated to lighter the consignment to the ship at the time designated. If it is late in arriving alongside the steamer it may be "shut out" and have to be delivered to another steamer at another point, this causing double handling. "Shut out" shipments cost both the consignee and the railroad money and are incidents that cause great consternation to the marine departments.

The lighterage agent of the marine department is the supervising officer and responsible party for the correct deliveries of lighterage freight, and his department keeps in



If you are now handling baggage and small freight with electric industrial trucks and tractors, you have adopted by all odds the most economical means of handling such material. But there is yet another important saving you can make, a saving that hinges upon your choice of a storage battery for those trucks or tractors.

One sure way to cut the cost of handling freight—

Equip your electric industrial trucks with a battery that will give you more speed, power and life, and less expense for repairs, charging and maintenance

THE number of trips your electric vehicles make, the speed with which they do their job, the days they spend out of service, the amount of charging they require, and the frequency with which you have to renew batteries—these are things that determine how much you pay to handle goods.

These are things, too, that should determine what storage battery goes in the battery box of your electric trucks and tractors. For the efficiency of your handling service, and the amount of money it costs you, is directly influenced by the performance of your storage batteries.

That is why marine men are more and more analyzing their handling costs and buying storage batteries on a performance basis. And that is why more and more of these men are standardizing upon Exide-Ironclad Batteries for freight handling. Exide-Ironclads have proved to be the make of battery that over a period of years will handle the most goods, in the quickest time, at the lowest cost.

**Why Exide-Ironclads
"deliver the goods"**

Exide-Ironclad Batteries have many

points of superiority—unique features of construction and performance that can best be explained by our personal representatives.

But to sum up briefly, the general advantages of the Exide-Ironclad are these five:

1. Power—No matter how steep the grade or how heavy the load, a truck powered by an Exide-Ironclad always moves right along. When there is more work to be done than usual, this battery has the peculiar ability to call on its tremendous reserve power and deliver more power than usual.

2. Speed—"Pep," the driver calls it, and pep this battery has—not just in the early morning when freshly charged, but all through the day and right down to the charging plug at night. The reason for the Exide-Ironclad's great stamina is that its voltage remains high throughout its discharge.

3. Ruggedness—An Exide-Ironclad is built to stand hard knocks. Rarely if ever does it lose any time out of service. Many companies report that during the entire life of this battery they have no repairs to make.

4. Long life—Actual service records show that the Exide-Ironclad Battery gives years of day-in and day-out service.

5. Low cost—The low cost of an Exide-Ironclad does not mean price alone—though that is reasonable. It means that the amount of money you pay for this battery, taking into account all factors such as repairs, maintenance, life, etc., is lower than you may expect.

Near you is an Exide branch where are battery specialists, men well qualified to talk over your handling problems with you and make suggestions how you can improve your service. One of these men will gladly call, and without obligation give you the benefit of our long experience in this field.

Or, if you prefer to have complete information about Exide-Ironclad Batteries to study at your leisure, drop us a line and ask for our booklet, "15 Points of Exide-Ironclad."

Exide

IRONCLAD BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, 153 Dufferin Street, Toronto

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constant touch with the terminal freight agents to keep all this class of traffic on the move. If shippers of export business want to get quick results, they will save time by dealing direct with him. His work is comparable to consolidation of traffic and accounting as in railroad practice.

If shipments eastbound are for local delivery, they are handled by two distinct methods, that is either by carfloat to pier freight stations or by lighter to public and private piers and bulkheads. Local consignees and coastwise steamship companies are on a regular towing order delivery. As an example, the Clyde Steamship Co.

heavy materials are handled usually on open piers where special apparatus, such as gantry cranes with derricks load them from the cars direct to the decks of the open boats. If, however, they are to be stored in transit, space is reserved on the pier where they are deposited, subject to the call or shipping orders of the consignee.

Westbound shipments are also run on schedule. Station cars are loaded direct while on the floats and leave the station piers on schedule time for regular trains west-bound. These trains are usually due out of terminals in the afternoon and the float movement

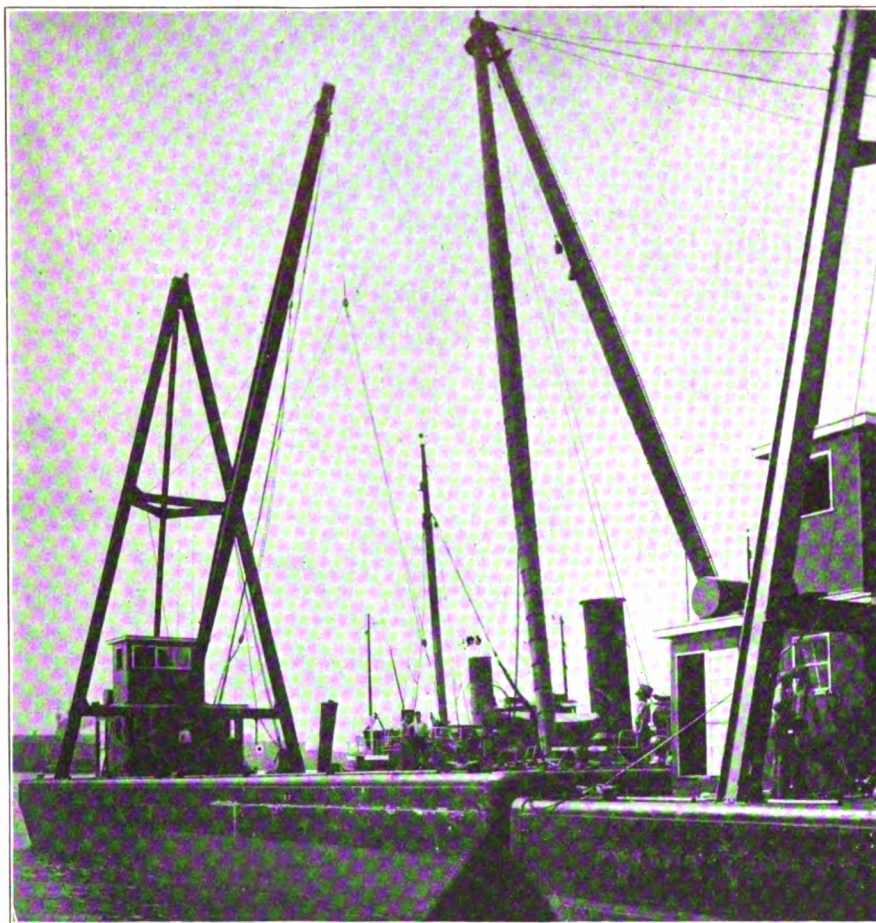
and other information. The latter then relay these orders to the pier men who in turn give them to the tug boats. Dispatching has seen no change since its inauguration years ago but since the advent of radio telephony experiments, boats in New York harbor will in the near future receive their orders from the ether waves. Radio when used will increase tug boat efficiency by over 10 per cent and thereby reduce operating costs by a like amount.

Grain for export is placed in grain elevators on arrival at this port and is held in storage until called for by the consignee. Shipping orders are obtained for a definite steamship, it is placed in grain boats, (or as they are commonly called, canal boats), and the unloading is done by a floating elevator at the ships side, after having been tested by an official weigher and tester. Grain is also bagged for export and carried to the ships side in covered barges. All grain is tested by an official tester of the bureau of tests of the produce exchange before being shipped.

Operation Closely Watched

I suppose my readers wonder how we know what our lighters are doing when away from the terminals. That is a situation which is covered by a corps of men with the title of shore foremen, but better known as "runners" and the appellation is merited. The harbor is zoned, with a man for each zone, and it is his duty to cover his territory, keeping tab on all company and chartered boats working there. Boat bills and manifests of cargo are checked, both eastbound and westbound. If a boat is held too long by the shipper it is up to the runner to find out the whys and wherefores. If the barge captain gets in a "jam" with the shipper, it is up to the runner to smooth out the trouble. He checks demurrage and wharfage and keeps things in general in his district on the move.

The marine departments of the big railroads employ from 1000 to 2000 men. The railroads entering this harbor own and operate over two hundred tug boats and thousands of other classes of craft that go to make up their fleets. Operation is carried on during the 24 hours of the day and seven days a week. Most of the marine offices are located next door to the shippers and have their agents keep in close touch with shippers, steamship operators and brokers, and produce exchanges. They have their own claim, traffic and accounting departments, cashiers and collectors. They have their own repair shops.



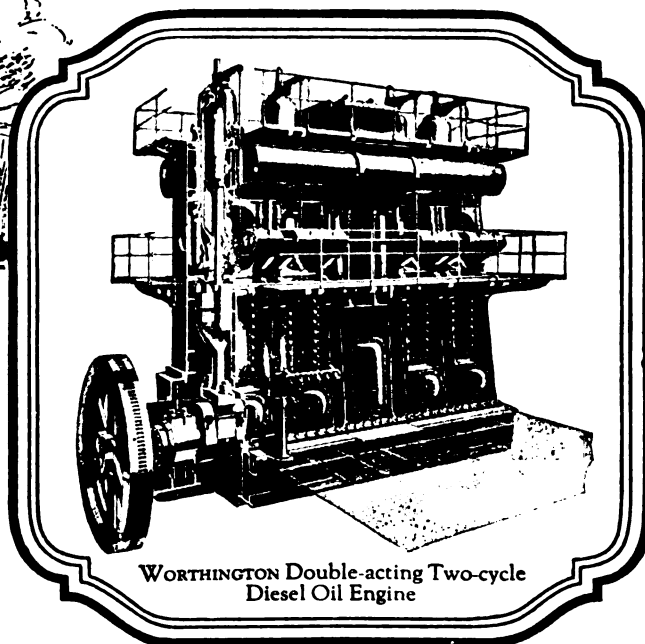
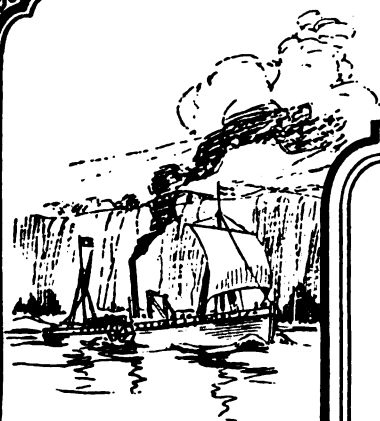
A NEW TYPE OF BARGE—ELLIS CHANNEL SYSTEM OF CONSTRUCTION WITH A 15-18-HORSEPOWER GASOLINE ENGINE FOR OPERATING THE DERRICK

has regular sailings on a definite schedule for points in the south from Wilmington, Delaware, to Miami, Florida. The Miami ships sail on Tuesday afternoon and the towing order calls for barge delivery at 8:00 a. m. Tuesday morning. The Ocean Steamship Co. has ships sailing Tuesday, Thursday and Saturday with "towing orders" for Monday, Wednesday and Friday barge delivery. The harbor has been zoned for local towing orders and all classes of commodities are handled under these orders.

Machinery, automobiles and other

has to be like clockwork, for to have the float cars miss the regular west-bound trains means to have the wrath of everyone along the line brought down on the heads of the sailors.

The tug power for all freight movements is under the jurisdiction of the superintendent. Under him come the tug dispatchers and captains. The dispatching is covered by three tricks of both headquarters and pier dispatchers, who work 8 hours each. The marine department notifies their headquarters dispatch men when boats are ready to tow and give all destinations



WORTHINGTON Double-acting Two-cycle
Diesel Oil Engine

“We’re Creepin’ On—We’re Creepin’ On”— “Less Weight and Larger Power”

THE words that Kipling put in the mouth of McAndrews, the “dour Scots engineer,” accurately describe the progress of the science of ship propulsion, not merely in steam, but in the use of a more efficient engine which neither Kipling nor McAndrews foresaw,—the Diesel oil engine.

But every so often, in human progress, the “creeping” gives place to a leap. Such a leap was taken when the Worthington engineers conceived the original idea which, for the first time, made the two-cycle, double-acting Diesel oil engine a thoroughly reliable and commercially successful marine engine.

At one stroke the new Worthington design

eliminates the weaknesses which have led to so many cracked cylinder-heads, so many cylinder failures; and advances the successful application of Diesel propulsion.

Yet back of this apparently spectacular advance was more than twenty years’ experience in the design and construction of internal-combustion engines, culminating in three years of careful research and experimental work that left nothing to chance.

The Worthington two-cycle double-acting Diesel oil engine is well suited to marine practice by reason of its high economy, lower weight, smaller size per horse-power and lower price.

WORTHINGTON PUMP AND MACHINERY CORPORATION

115 BROADWAY, NEW YORK CITY

BRANCH OFFICES IN 24 CITIES

WORTHINGTON

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Motorship Gripsholm

(Continued from Page 19)

74 feet; depth molded to boat deck, 76 feet 6 inches; depth molded to "D" deck 42 feet 6 inches; load draft, 29 feet; load displacement, 23,600 tons; deadweight, 10,000 tons; gross tonnage, about 17,300; oil fuel capacity 2450 tons. There is 284 cubic feet of ordinary cargo space, and about 13,000 cubic feet of insulated cargo space. Mail and baggage rooms of 10,000 cubic feet are provided.

The vessel has been built according to the Rules of Lloyd's register under special survey and has received the highest class. Board of trade, American, Swedish, Suez and Panama canal regulations have all been met. The Gripsholm has eight decks designated as follows, boat, promenade or "A", bridge or "B", shelter or "C", upper or "D", main or "E", lower or "F" and Orlop or "G". Booked to maximum capacity the vessel will carry 1617 passengers. Of this number 129 is first class, 482 is second class and 1006 is third class.

Accommodation is provided for a crew of 320 officers and men, making a total population on board of 1937. Thirty 30-foot life boats and two 30-foot motor boats are carried under 16 sets of Welin davits. The total capacity is equal to the total population.

In layout, equipment, furnishings and taste and beauty of interior decorations of all public rooms there is evidence of skill and art of high order, with fine workmanship. A flavor of an older, simpler and perhaps a truer period prevails in the style used. All power on board is electric, generated by diesel engines.

Freight Handling Costs

(Continued from Page 35)

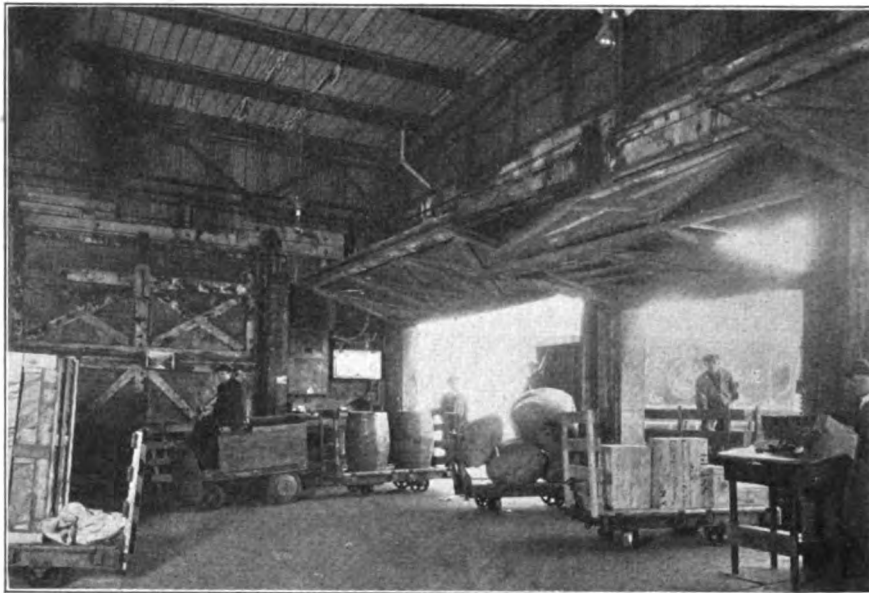
a line running through the middle, parallel to the river. The unloading level on the street side is flush with the average height of the trucks that either deliver or receive freight.

With a total crew of 12 men and one tractor, it is possible to take average freight off the boat at Troy at the rate of about 60 tons an hour. The work done here by the power unit is to pull loaded trailers up the grade, to help out the hand truckers on the same pull, and to place trailer loads of down river shipments in the boat. The tractor is busy intermittently over a 12 hour day. The Troy manager, Mr. Broderick states that at the rare intervals when the tractor is down the men lose heart—usually to such an extent that several extra men have to be put on to help out.

The proof of any pudding it is well known, is in the eating. During the War prejudice against mechanical methods of freight handling was temporarily broken down in many quarters. It is a conspicuous fact that the concerns that went into modern methods at that time as an emergency measure have come out enthusiastic

are many docks and piers where the old hand methods still prevail—where the golden guiding principle is 'Let good enough alone.'

When mechanical equipment has demonstrated its fitness, beyond shadow of doubt, not only to effect worthwhile savings but also to improve working conditions, it becomes a just-



RECEIVING FREIGHT FROM MOTOR TRUCKS TO TRAILERS ON THE NEW YORK PIER OF THE HUDSON NAVIGATION CO.

as to their permanent value. That is perhaps one reason why, at the New York waterfront, most concerns operating daily freight and passenger service are continuing to use storage battery trucks or tractors. Their balance sheets on costs indicate the wisdom of such a course. In some sections of the country, however, there

is a considerable investment. Unlike desirable stocks and bonds trucks and tractors, power driven, do not earn only 6 to 8 per cent; rather their earnings run from 50 to 300 per cent annually. Although anyone making such a statement may seem extravagant, the facts are on his side and are capable of substantial proof.

U. S. S. B. Vice Presidents Appointed

G. K. Nicholls and J. Harry Philbin have been appointed vice presidents of the Fleet corporation. Captain Warren F. Purdy, former district director at Boston, is to become director for Europe. James A. Wilson, recently connected with the operating department of the Munson Steamship line, has been appointed the director of operations to fill the vacancy made by the resignation of Asa F. Davidson. Mr. Philbin will be vice president in charge of ship sales and in addition, will be in complete charge of the laid-up fleet.

Ray A. Sossong, manager of gas plants, Air Reduction Sales Co., New York, was elected president of the International Acetylene association at the recent annual convention in Chicago.

Board Accepts Franklin's Bid for So. African Line

John M. Franklin of New York, on December 10 made a bid of approximately \$780,000 for the American-South African line operating five freighters from New York to South Africa. This amounted to \$18.10 per ton. Mr. Franklin represented the American-South African line, a corporation to be formed under the laws of New York. Captain Elmer E. Crowley, president of the Fleet corporation, recommended that Mr. Franklin's bid be accepted. The sale was put up to the board because there was some protest entered by A. H. Hull & Co., the present operators along with their two bids for the line. It is claimed that there is overwhelming British competition.

On Dec. 22, Chairman O'Connor announced that the board had agreed to sell to Mr. Franklin.

INGERSOLL-RAND DIRECT-INJECTION OIL ENGINES

Make Good in All Classes of Towing Service

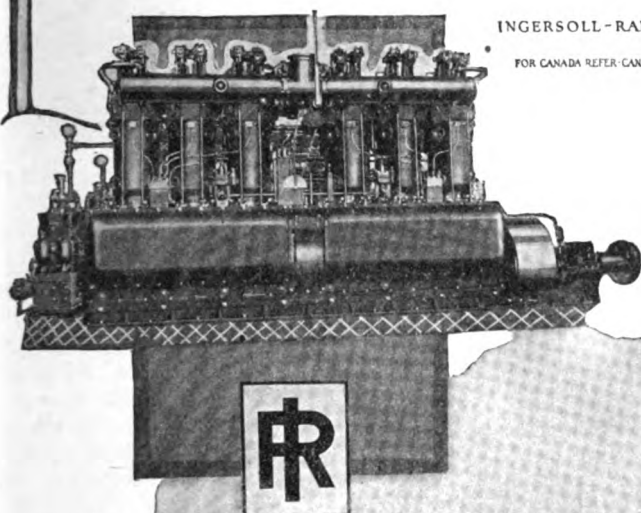
THE seagoing tug "Sonittep" has been engaged in towing gravel barges from Newport News to Boston for over a year.

This tug is propelled by an Ingersoll-Rand direct-injection four-cycle oil engine. This engine is direct reversing and is maneuvered by a *single lever*, which controls the starting, stopping, reversing and speed.

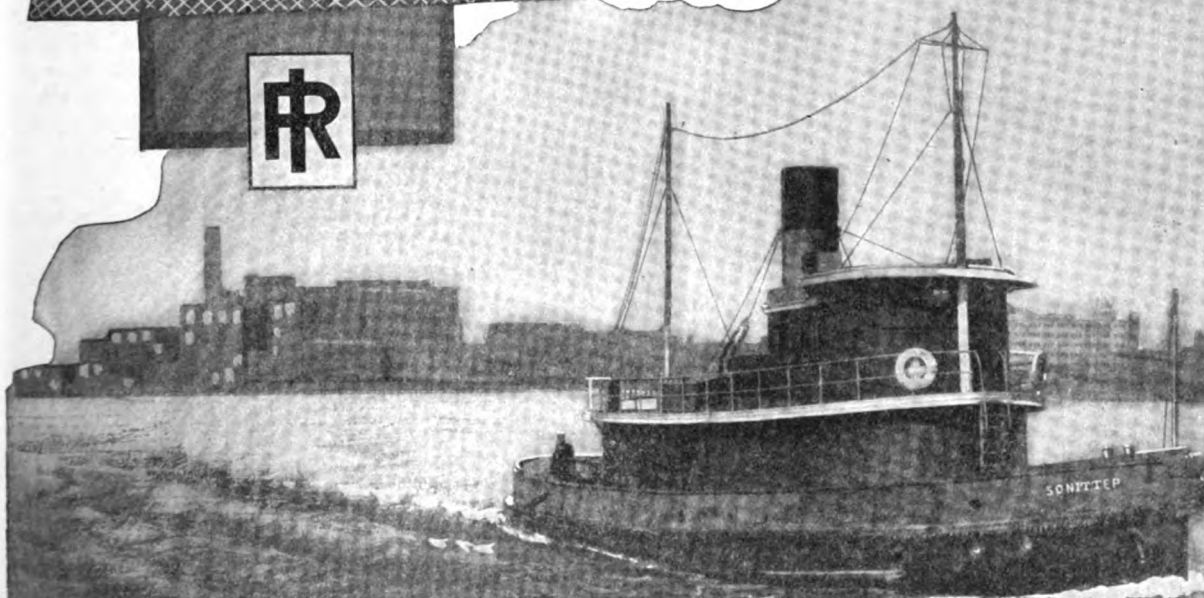
This is one of the many classes of towing service in which Ingersoll-Rand Oil Engines have made good.

Specify Ingersoll-Rand Oil Engines.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY
Offices in principal cities the world over
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35-MOE



Ingersoll-Rand

R-673

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Andrew Fletcher 1863-1925

(Continued from Page 20)

Lake Champlain; steamboats for Boston harbor and over 200 other steamboats and yachts of various kinds.

Another notable development for which credit must be given to the W. & A. Fletcher Co. is the double screw ferryboat, carrying screw propellers at each end. This type of boat was first built for the Hoboken ferries then owned by the Stevens family of Hoboken, N. J., the New York Central, West Shore Ferry lines, and the type was subsequently adopted by many of the other ferries of New York harbor, Philadelphia, Boston and other places. During the late World war the company gave its best services to the government and converted and reconverted after the war many ships for transporting troops and other war time purposes for both the United States army and navy departments. The machinery for about 50 ships, the large majority being of

the single and double reduction geared steam turbine type was built during this period. It is interesting to note that a member of the third generation of the Fletcher family is now active in the management of this pioneer and productive enterprise.

In the fall of the year 1913 Mr. Fletcher became identified with the American Locomotive Co. as director and member of the executive committee. In January, 1917, his invaluable services in that capacity were recognized by his elevation to the presidency of the Locomotive company, a post which in addition to being the active head of the W. & A. Fletcher Co., he continued to hold until the end.

Other important corporations with which Mr. Fletcher was identified as an official are the American Locomotive Sales Corp., the Montreal Locomotive Co. and Consolidated Iron Works, of which companies he was president and director. He was a

director of the Chase National bank of New York, the First National bank of Hoboken, The American Car & Foundry Co., the Canadian Car & Foundry Co., the Bucyrus Co., the Locomotive Superheater Co., the Consolidated Textile Co., the American Surety Co., the William Cramp & Sons Ship & Engine Building Co.

He was a member of the American committee of Lloyd's Register of Shipping. Mr. Fletcher was a life member of the executive committee of the Society of Naval Architects and Marine Engineers, member of the American Society of Mechanical Engineers, life member of the Institute of Engineers and Shipbuilders of Scotland.

Mr. Fletcher married in New York City April 10, 1894, Jean Landels Drummond, daughter of the late John L. Drummond, a prominent banker and broker of New York City. There are two children, Andrew Fletcher Jr., and Jean Fletcher.

Barge Is Wrecked—But Not Damaged

SINCE the article which appeared in the August, 1925 issue of MARINE REVIEW on the construction of Ellis channel steel gasoline hoisting barges under construction for the New York Central railroad, an interesting episode has given an actual demonstration of the ability of these barges to withstand about any assault which may be made upon them.

The last three of these boats to be delivered to the New York Central left Boston on Nov. 11, in tow of the Tug NEPTUNE. During the entire trip there was a heavy northeaster blow-

ing and while passing Fort Slocum early on the morning of Friday, Nov. 13, the RICHLAND, which was on the tail of the tow, broke loose and was driven $\frac{3}{4}$ of a mile over the rock ledges and finally landed nearly high and dry on the granite outcropping on Fort Slocum island.

The captain of the barge stated that during her travels she landed on pinacles in the trough of the waves and at times spun like a top, and at other times bumped against the rocks, rebounded and went hurtling forward until she arrived at her final landing

place as shown in the accompanying illustration.

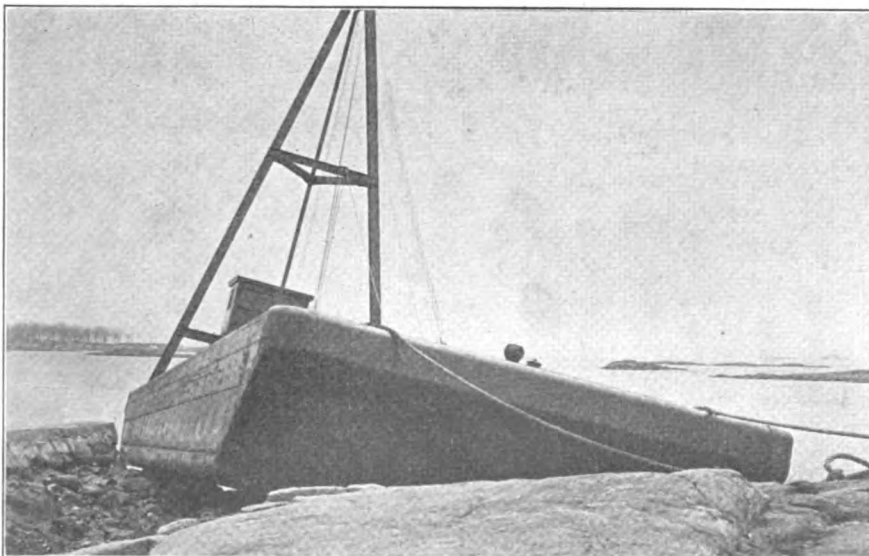
Upon a survey being made, it was found that a high tide and lots of pull would be necessary to get her off, and on account of certain contingencies she was not released until Sunday morning, Nov. 15. During all that time the barge was subject to continuous buffeting by the strong winds which were blowing. However, she was towed without any caulking, or plugs, to dry dock.

Upon examination no leaks were found and only a very few dents showed in some of the channels and plates and the damage from a monetary standpoint was negligible.

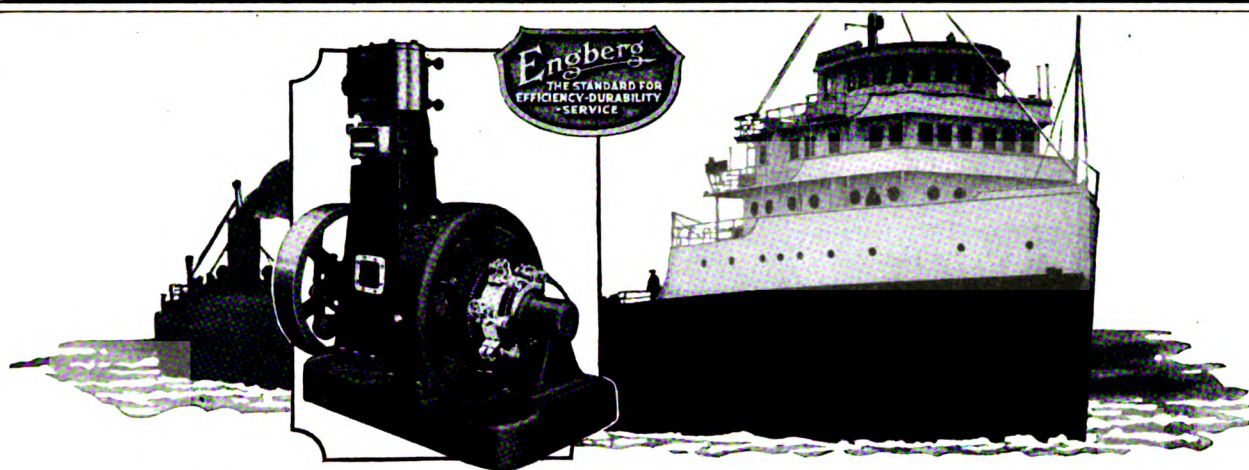
Under the conditions of this accident, according to one of the railroad marine department officials, if this had been either a wooden boat or a plate job, this barge would have been a total loss.

Ferryboats Ordered

Two new ferryboats are to be built for the East Boston service at the Fore River plant of the Bethlehem Shipbuilding Corp., Ltd. One of the boats will replace the HUGH O'BRIEN which is a sidewheeler and in service since 1883. Each will be equipped with an auxiliary fire-fighting service for emergency work and will have a capacity of 50 or 60 vehicles.



NEW YORK CENTRAL CHANNEL STEEL BARGE BLOWN ON THE ROCKS WITHOUT APPRECIABLE DAMAGE



Results Justify Repeat Orders

TWO MORE Pickands Mather Ships, under construction by the American Shipbuilding Company, Cleveland, will each be equipped with three ENGBERG Marine Generating Sets.

What more impressive proof of ENGBERG superiority and dominance in the marine field than consistent re-

peat orders from the leading corporations of America?

Thirty years of practical experience, backed by the desire and will to produce the best, and aided by the advice of hundreds of engineers, have made the name of ENGBERG stand for the ultimate in quality, economy, and long life. Be sure to write for Catalog 105.

ENGBERG'S ELECTRIC & MECHANICAL WORKS, 225 Vine Street, St. Joseph, Mich., U. S. A.

ENGINES

ENGBERG

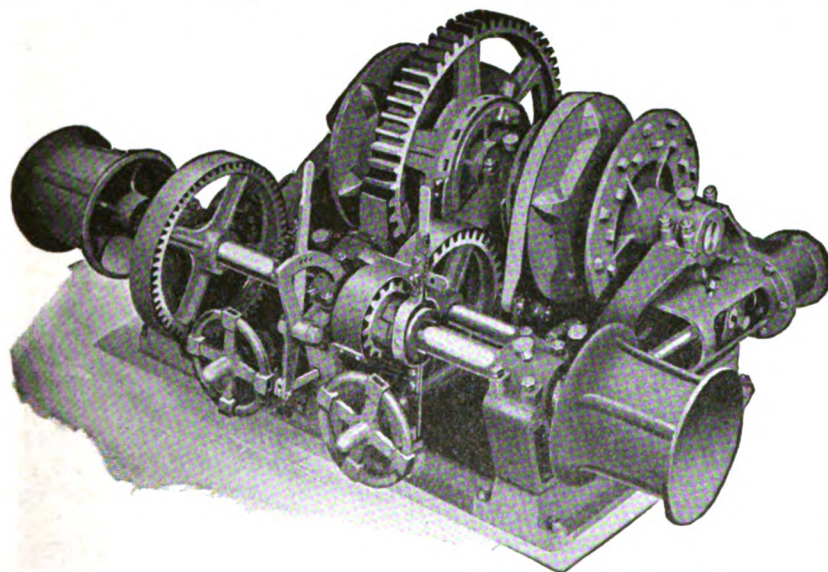
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SETS

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MOTORS

SWITCHBOARDS

The "Superior" Spur Geared Windlass



WE ALSO BUILD

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- Winches
- Hoisting Engines
- Swinging Engines
- Power Pawl Posts
- Dredge Deck Engines
- Anchor Hoists
- Scow Winding Gears
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Manufacturers of

Steam and Electrical Machinery

SUPERIOR IRON WORKS COMPANY

SUPERIOR, WISCONSIN

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General Uhler Resigns

(Continued from Page 21)

that General Uhler assumed the duties of supervising inspector general, the steamboat inspection service was an organization that was tolerated or permitted to exist. Today, it is second to no Federal service, not alone in the importance of the functions that it is required to perform by the statutes of the United States, but also as a result of the excellent organization that has been built up by the present supervising inspector general.

A Practical Seagoing Engineer

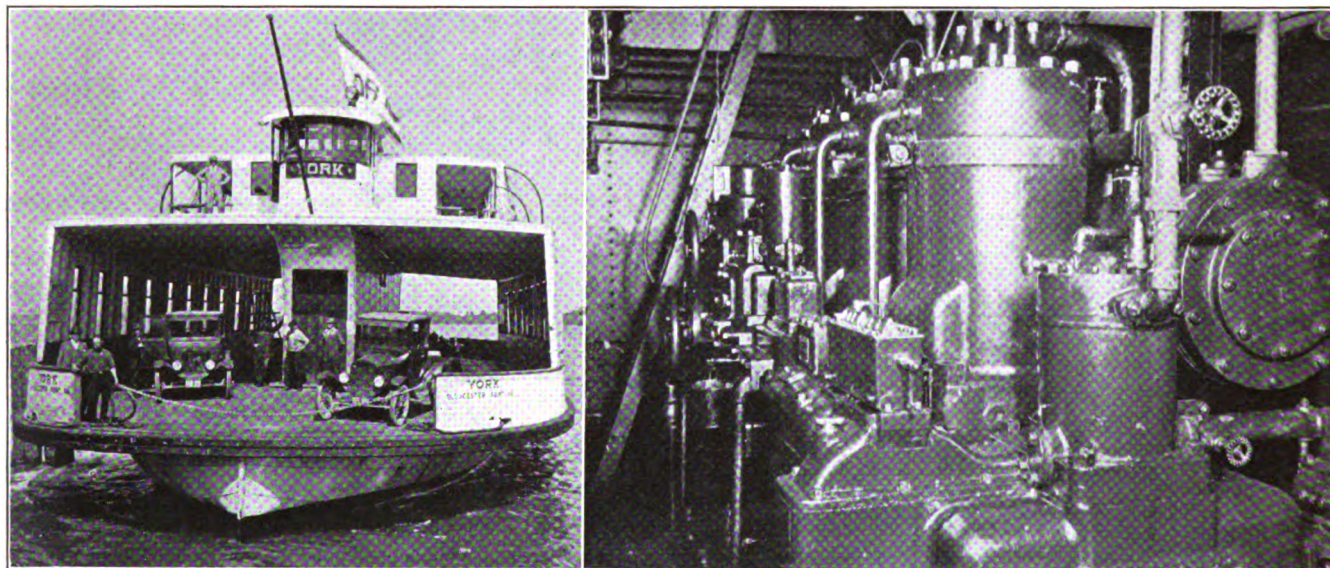
George Uhler was born June 5, 1853, at Delaware City, Newcastle county, Delaware. In 1870 he started to sea and worked himself up through the various grades, and was finally licensed as chief engineer of ocean

steamers, unlimited, in 1877. At the age of 28 years he was the chief engineer of the largest cargo steamer on the western ocean. He joined the Southern Pacific Co. on May 30, 1881, and left there after 12 years of service as chief engineer of vessels of the fleet of that company, the last ship being the steamship EL SOL, which is now the PRAIRIE of the United States navy. He served for three years as national treasurer of the Marine Engineers' beneficial association, and for ten years as national president of that organization, when he was appointed by President Roosevelt as supervising inspector general and took oath on April 1, 1903. He resigned that position Nov. 30, effective at the close of business on Dec. 31, 1925. He was one of the American delegates to the international

conference on safety of life at sea, held in London from November, 1913, to January, 1914.

Perhaps the most outstanding characteristic of his strong personality is honesty. With honesty in the administration of executive affairs must always go moral courage, so that as one looks at this personality that has stood four square, strong and clean and able, one is impressed by the strength and the virility of the man. Not alone was it the pleasure of the President of the United States to recognize this fact, but the same thing is testified to by the business interests of this country who have had occasion to deal with General Uhler. The steamboat inspection service may ever be proud to recall his faithful and productive leadership.

Diesel Drive in Ferry Is Economical



LEFT—FERRY BOAT YORK IN SERVICE BETWEEN GLOUCESTER POINT, VA., AND YORKTOWN, VA. RIGHT—240 BRAKE HORSE-POWER FAIRBANKS-MORSE DIESEL ENGINE IN THE FERRY YORK, DRIVING TWO PROPELLERS THROUGH CLUTCH

THE automobile ferry YORK which was placed in service between Gloucester Point, Va. and Yorktown, Va., last fall, is an interesting example of how the diesel engine can solve the problem of a double end drive. The 240-horsepower Fairbanks-Morse diesel engine is clutch connected to one propeller forward and one aft. As the boat docks in a slip, considerable maneuvering time is saved in making landings and in getting away on the return trip.

This ferry is owned and operated by W. T. Ashe of Gloucester Point, Va. and replaced a smaller boat powered with a 60-horsepower Fairbanks-Morse "CO" engine. Increased busi-

ness made it necessary to put on a larger boat and Mr. Ashe, after investigating various types of engines and drives, decided on a diesel engine with a double end drive arrangement. The ferry connects two of the main highways of Virginia and tourists traveling between the northern and southern states find a great saving of time by crossing the river instead of taking the other routes.

Built in Record Time

Eads Johnson, New York City, designed the vessel and she was built by the Spedden Ship Building Co., Baltimore. The contract was signed on March 28, 1925; the keel was laid

on May 18. She was launched on Oct. 19 and completed on Sept. 4, 1925. The ferry is designed to accommodate between thirty and thirty-five motor vehicles, placed in four lines on the main deck.

The dimensions of the vessel are as follows:

Length overall, ft.	115
Breadth molded, ft.	33
Breadth over guards, ft.	44
Depth molded, ft.	12
Draft, ft., in.	6 6

The hull is constructed of steel, with a wooden main deck supported by fore and aft steel trusses and two rows of stanchions. There is an upper deck and house for passengers.

POST'S MOTOR MARINE METAL

**STANDARD
in the Largest
SHIPYARDS**

Specified by Leading Naval Arch-
itects and Steamship Companies

The ideal babbitt-metal for heavy pressure bearings, crank pins, slides and thrust bearings in all types of marine engines.

We guarantee our metals to be made 100% of virgin raw materials of the highest grades at all times.

E. L. Post & Company, Inc.

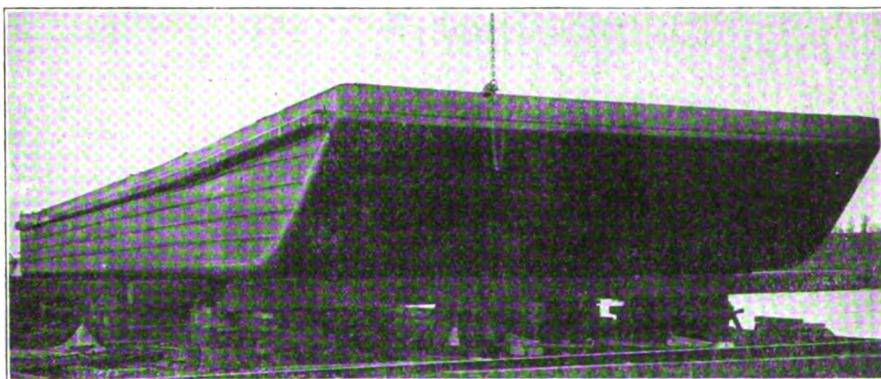
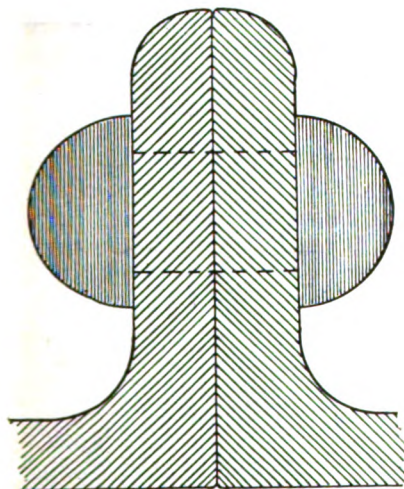
SOLE MANUFACTURERS

50 Cliff Street

New York City

Channel Steel Hulls

All Steel Channel Deck Lighter
for U. S. Engineers, completed
at Rome, N. Y., June, 1925.
Note Sheer at ends.



—a Positive Sealed Joint

Rivet Pitch 6-inch Centers

No Special Rolled Channels required and all
Caulking is eliminated.

Channel Steel Barge Co., Rome, N. Y.

W. G. BARTENFELD, GREAT LAKES MANAGER, LORAIN, OHIO

Please mention MARINE REVIEW when writing to Advertisers

Between the main and upper deck a steel casing 60 feet long and 6 feet wide encloses the upper engine room and end stairways.

In addition to the 240 horsepower, two cycle airless injection diesel engine, Fairbanks, Morse & Co. also provided the auxiliary equipment. A 15 horsepower, two cylinder oil engine direct connected to a 9 kilowatt, 125 volt direct current generator supplies current for lighting and for driving the electric auxiliaries.

Starting air is supplied by a $4\frac{1}{2}$ x $4\frac{1}{2}$ inches single cylinder water cooled air compressor driven by a $7\frac{1}{2}$ horsepower 1750 revolutions per minute 115 volt, Fairbanks-Morse ball bearing motor. This compressor pumps to four 30 x 96 inches air tanks. This gives the engineers two tanks for reserve purposes as the capacity of the air compressor on the main

engine is sufficient to maintain the pressure in two of the tanks. These two tanks are of sufficient capacity to hold enough air to do all of the maneuvering ordinarily necessary for handling the boat.

Low Fuel Consumption

For fire purposes a 2 inch centrifugal pump is driven by a 5 horsepower 1750 revolutions per minute, 115 volt compound wound ball bearing motor. The ordinary bilge service is taken care of by a $2\frac{1}{2}$ x 3 inches plunger pump which is driven from the main engine shaft. Should the boat develop a bad leak the fire pump is so connected that it can be used for bilge service.

On Sept. 4 the machinery and auxiliaries were given a dock trial and the boat left the builder's yard on Sept. 6 for Gloucester Point. Although no trial trip had been made the run

of 142 miles from Baltimore to Gloucester Point was entirely successful. On this run the fuel consumption was 8 gallons per hour although since the boat has been placed in service this has dropped to $7\frac{1}{2}$ gallons per hour. With the engine turning at 215 revolutions per minute the boat made approximately 9.13 statute miles per hour on this trip.

In regular service the boat makes two round trips every hour, the running time from dock to dock being about eight minutes.

It has been found that the double end drive enables the boat to dock quickly and to get away quickly on the return trip as there is no time lost in turning the boat around. In handling the boat the forward rudder is locked in a central position by a sliding bolt and the other rudder is used for steering.

Steamer Halcyon Launched at Detroit

THE steamer HALCYON for the Walkerville and Detroit Ferry Co. which was launched at the River Rouge yard of the Great Lakes Engineering Works, Dec. 12, is a duplicate of the steamer WAYNE, built two years ago for the same company.

Hull Characteristics

Length overall in feet..... 142
Length on keel in feet.....128
Extreme beam, feet, inches.....56 8

Beam of hull in feet.....45
Depth molded, feet, inches.....15 8

This vessel has a capacity of approximately 50 automobiles on the main deck, and cabin capacity for about 500 passengers.

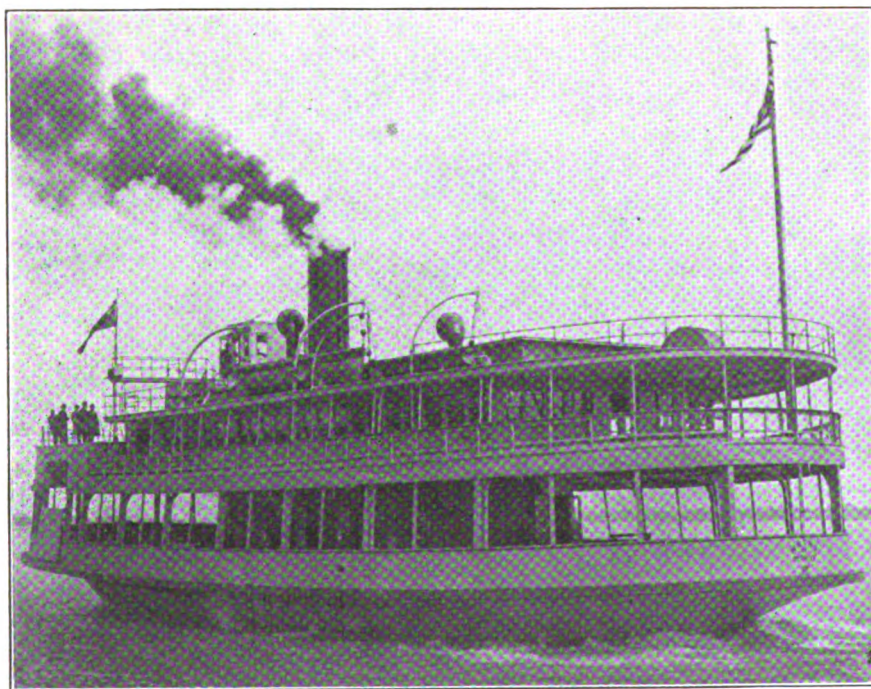
Propelling machinery consists of a fore and aft compound engine with cylinders 20 inches and 40 inches in diameter by 28 inches in stroke. Maximum horsepower is 1000 at 130 revolutions per minute.

This power is only necessary for work in heavy ice. Steam is supplied by two Scotch boilers, 10 feet 6 inches in diameter by 11 feet over the heads. Allowed steam pressure is 175 pounds. Total heating surface is 3134 square feet, total grate surface is 77 square feet. Forced draft is supplied by one American Blower fan, direct connected to a 5 x 5 inches single cylinder engine.

For auxiliaries there are: one air pump and jet condenser 14 and 28 x 18 inches vertical, simplex; one feed pump 8 and 5 x 12 inches horizontal, simplex; one general service pump 8 and 5 x 12 inches horizontal, duplex; one combined sanitary and bilge pump $5\frac{1}{2}$ -5-5x5 inches horizontal, duplex. The main generator is 10 kilowatts capacity of Crocker-Wheeler make. The auxiliary generator is 5 kilowatt capacity, made by Westinghouse Electric & Mfg. Co. There is also a Reilly No. 10 feed water heater.

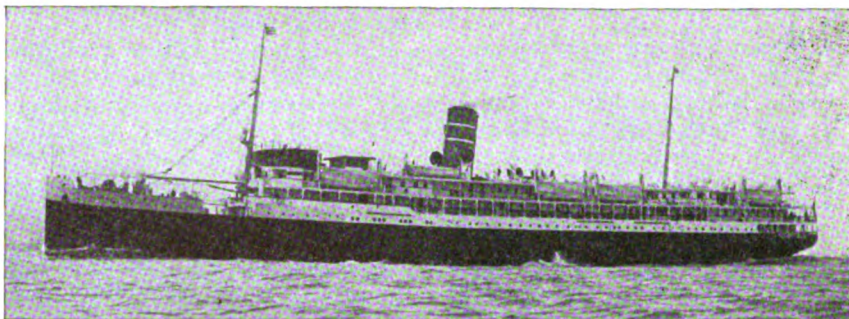
The accompanying illustration shows the ferryboat WAYNE, and the HALCYON will be exactly the same when completed. According to present plans the HALCYON will go into commission about March 1.

Announcement has been made by the New York & Cuba Mail Steamship Co. that Mr. David A. Wahmond has been appointed purchasing agent and in charge of the commissary department of the company, with headquarters at pier 13, East river, foot of Wall street, New York city.



STEAMER WAYNE BUILT BY THE GREAT LAKES ENGINEERING WORKS TWO YEARS AGO FOR THE WALKERVILLE AND DETROIT FERRY CO—THE STEAMER HALCYON LAUNCHED AT THE SAME YARD FOR THE SAME OWNERS ON DEC. 12, 1925 IS AN EXACT DUPLICATE

ROBERT E. LEE—A single screw steam turbine reduction gear passenger ship, in service between New York and Norfolk, Va., carrying passengers and freight.



WELIN DAVITS

are in use on many of the largest ships afloat. Passenger vessels, freighters, bulk oil vessels, dredges or barges are best protected when Welin equipped.

Welin Life Saving Equipment has a reputation among marine men as being modern and dependable. In times of danger officers and crew rely on the high character of its construction to meet any emergency.

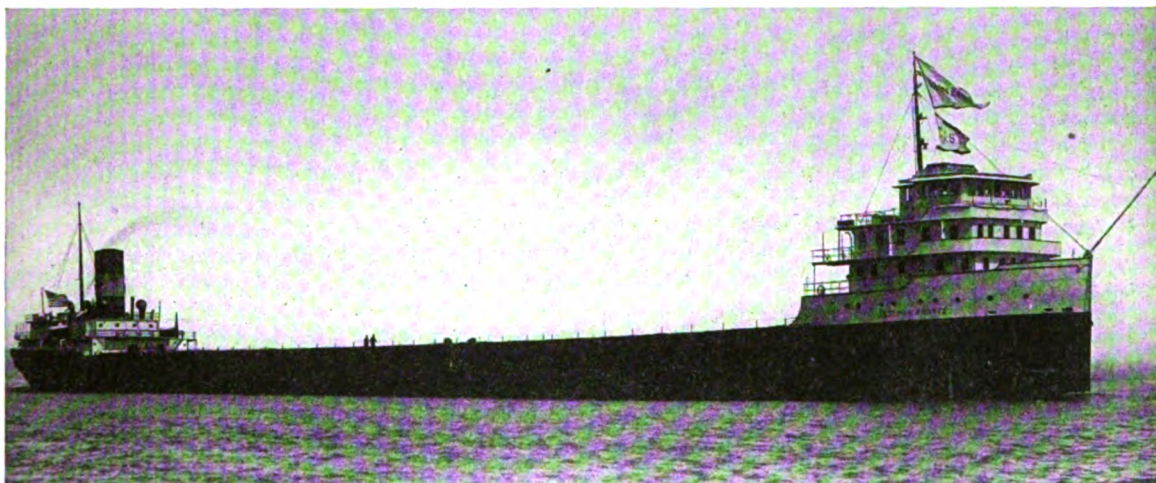
Welin Davit & Boat Corporation
305 Vernon Ave. Long Island City, N. Y.

We also manufacture

Welin Radio Turning Out Gear, Steel or Wood Lifeboats, Metallic Life Rafts and Balsa Life Floats, Welin Non-Topping Blocks, Mills Releasing Gear, Steel or Wood Commercial Boats of Standard or Special Design, Welin Electric Boat Winches.

THE BABCOCK & WILCOX CO.

Manufacturers of Marine Water Tube Boilers Since 1895



Steamer "JOSEPH H. FRANTZ", The Columbia Steamship Company

Equipped with
Babcock & Wilcox Water Tube Boilers and Superheaters

THE BABCOCK & WILCOX CO.

Marine Department
85 LIBERTY STREET, NEW YORK

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British Marine Show

(Continued from page 25)

at least 500 pounds per square inch and superheated to a temperature of 700 degrees Fahr. The turbines consist of high pressure, intermediate pressure and low pressure elements at 5000, 3000 and 1700 revolutions per minute respectively, driving separate pinions and coupled through double-reduction gearing to a propeller shaft at 90 revolutions per minute, giving a suitable vessel a speed of 14 knots.

The North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne, showed a working scale model of a quadruple expansion engine, surface condensing, of the balanced type. The original engine developed 4000 horsepower and gave the ship a speed of 12½ knots, the displacement of the ship being 12,500 tons. There was also a working scale model of a North Eastern eight-cylinder marine diesel engine of the four-cycle, single-acting type. The engine develops 3000 indicated horsepower at 92 revolutions per minute. Samples of "perlite" castings of which the company has bought the rights, were also exhibited.

James Pollock Sons and Co., Ltd., Lloyd's Ave., London, who is the British representative of G. & C. G. Bolinders Co., of Stockholm, Sweden, showed a model of the B. M. engine made in single, two and four cylinder types in powers ranging from 7 to 600 brake horsepower. The engines are of the two-stroke single acting type, hot bulb ignition with crankcase compression, and work on paraffin, residue, heavy or tar oils. This is a new model where both fresh water and air injection have been discarded by the use of a novel fuel injection device. Starting is obtained by electric ignition, enabling the engine to be started from cold in 15 to 20 seconds.

Marked Progress in Oil Engines

Sulzer Bros., London, showed the Sulzer 300 horsepower two-cycle reversible diesel marine engine with airless injection demonstrated under load.

A vertical oil engine was exhibited by Worthington-Simpson, Ltd., Newark-on-Trent. The engine is of the two-cycle solid injection type. The one on display was a three-cylinder engine of 225 horsepower. These engines are built in units developing 30, 50 and 75 brake horsepower per cylinder, so that a great number of different sizes of engines can be built up by using multiples of these units.

Vickers-Petters, Ltd., Ipswich,

showed a four-cylinder, direct reversing marine engine of 100 brake horsepower. Engines of this type are manufactured in units of two, four and six cylinders ranging from 50 to 600 horsepower. Reversing is done by means of compressed air. The engine is fitted with electric starting apparatus which enables it to be started immediately from cold. One 120 horsepower marine two-stroke heavy oil engine was displayed by Norris, Henty & Gardners, Ltd., Patricroft, Lancashire. This type of engine is built up to 300 horsepower; it is a 4-cylinder unit of direct reversing type. Other smaller units were displayed by the firm. Two Kromhout engines were exhibited by Periman & Co., Ltd., Fenchurch Street, London. Kromhout engines run up to 700 horsepower; the heavy models are reversed by means of compressed air.

Floating Dock Launched

On Nov. 10, 1925, the largest single section wooden floating dry dock ever constructed, was launched at the Brewer Dry Dock Co.'s plant, Staten Island, N. Y. A brief illustrated account of this launching was given in the December issue of *Marine Review* on page 464, the name of the builders not being known at the time.

Paraffin engines with reverse gear up to 105 horsepower were displayed by Gleniffer Motors, Ltd., Glasgow, Scotland. John I. Thornycroft & Co., Ltd., Southampton, had a large exhibit mostly connected with power boating; this firm is well known in marine engineering circles.

In the boiler department, Babcock and Wilcox, Ltd., Babcock House, London, showed models of their patent water tube steam boilers with patent steam superheater and chain grate stoker. They also displayed a patent oil fuel burner mounted on a furnace front and arranged to work with forced draft, a crude oil engine, a totally enclosed steam winch, a Fuller-Kinyon pulverized coal conveyor, and several other appliances. A fuel economizer applied to a water tube boiler was shown by E. Green & Son, Ltd., Wakefield. Clarkson Steam Motors, Westminster, London, showed examples of their patent thimble tube boilers developed for waste heat recovery from diesel engines and furnaces. The Yorkshire Copper Works, Ltd., Leeds, are tube specialists, and the central feature of their exhibit

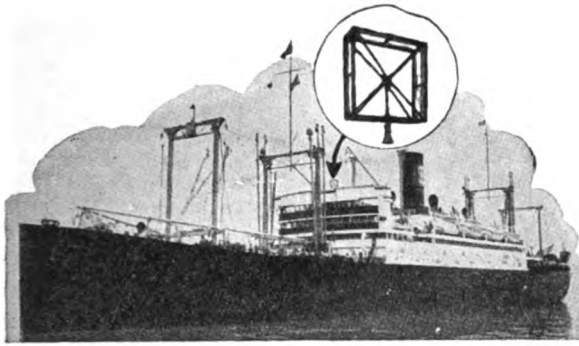
consisted of a pyramid built up of cupro-nickel condenser tubes.

The increasing use of fuel oil in ships has developed the manufacture of oil purifiers and separators. Vickcen separators were displayed by British Separators, Ltd., Queen's Road, Peckham, London; the range of machines shown was from 10 to 2000 gallons per hour. It is claimed that the latter machine can deal with over six tons of diesel fuel oil per hour. The exhibit included a Vickcen separator specially enclosed for the treatment of fuel oil on board ship. A De Laval centrifugal oil purifier was shown by De Laval Chadburn Co., Ltd., Wellington House, London. In the De Laval closed or funneless system the fuel oil is not exposed to the atmosphere but is led to and from the machine through closed pipes, and sight glasses are fitted for observation purposes. Chadburn's (Ship) Telegraph Company's naval and mercantile telegraph installations were displayed at the same stand.

Many Types of Auxiliaries

R. C. Knight & Dunford Smith, Bishopsgate, London, exhibited their conduit patent oil separator. Its action is continuous and automatic, and its capacity ranges from 10 to 200 tons per hour. Super-Centrifugal Engineers, Ltd., Aldwych House, London, displayed several models of Sharples oil purifiers. One type which had not been shown previously is totally enclosed, fumes and gases are carried to deck and the oil that remains in the bowl of the centrifuge when the machine stops drains automatically to the fuel oil bunkers. One portable type was shown in operation. An Iwel steam turbine centrifugal oil filter was exhibited by Industrial Waste Eliminators, Ltd., High Holborn, London.

Between 20 and 30 exhibits displayed pumps, refrigerating machinery, compressors, and other equipment. Pumps were shown by Zwicky, Ltd., Slough, Buckinghamshire; Sulzer Bros., Boulton & Paul, Ltd., Norwich; the Aster Engineering Co., Ltd., Wembley, Middlesex, who also showed a new type of feed water regulator. Stothert & Pitt, Ltd., Bath, displayed pumps and Burn's patent gears. Electric ship's winches and steering gears were exhibited by Laurence Scott & Co., Ltd., Norwich. A refrigerating plant for cargoes and docks was exhibited by John Davies Insulating Co., Ltd., Liverpool. H. J. West & Co., Ltd., London, J. & E. Hall, Ltd., London. Air compressors were shown by Holman Bros. Ltd., London, who hold the rights of the Hele-Shaw Beacham



The President Lincoln is one of several of the Dollar Steamship Line equipped with the Kolster Radio Compass

The Kolster Loop says "Protected!"

The square loop of the Kolster Radio Compass over the bridge is the sign of a "protected" ship.

Protected—at harbor entrances—at sea. Protected—despite the weather! With a Kolster Radio Compass, navigating officers can not only accurately establish the ship's position in the densest fog, but can also obtain a fix in fair weather when far outside of the sight of land.

This is "protection" worth investigating.

Send for Bulletin 25



FEDERAL TELEGRAPH COMPANY

SAN FRANCISCO
25 BEAVER STREET, NEW YORK CITY
Japan-China Representatives:
Sperry Gyroscope Co., Mitsui Building, Tokio



"She's as tight as a Bowl"

A staunch tight vessel is
a joy forever.

Every true sailor man loves
to sing the praise of such a
craft.

Every old timer knows that

STRATFORD OAKUM

is the best caulking ma-
terial obtainable.

Its superiority has been
proved by nearly a cen-
tury of service.

Be sure you get it. Do not
accept a substitute.

GEORGE STRATFORD OAKUM CO.
Jersey City, N. J.

*

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rotary compressor, and by Lacy-Hulbert & Co., Ltd., London, Reavell & Co., Ltd., Ipswich, and W. H. A. Robertson & Co., Ltd., Bedford.

The Ramsay Engineering Co., Ltd., London, showed a patent governor for marine steam engines and a more recent one for internal combustion engines. This firm is represented in America by Chas. Cory & Son, Inc., Varick Street, New York. The Mac-lachlan Automatic Boat Davit Co., Ltd., Glasgow, exhibited a working model of their gravity davits which can be operated by one man. Benjamin R. Vickers & Sons, Ltd., Leeds, showed their propeller box. A. Harper, Sons & Bean, Ltd., Dudley, worked the Hele-Shaw Beacham variable hydraulic transmission which they manufacture. The Birmingham Small Arms Co., Ltd., Birmingham, exhibited their line throwing guns, both the shoulder pattern and the mounted type. The Light Buoyant Apparatus Co., Ltd., exhibited various types of rafts and floats.

Fine Aids to Navigation

There were several exhibits of nautical instruments and special accessories. Kelvin Bottomley & Baird, Ltd., Glasgow, displayed their Kelvite compasses and sounding machines, their stability indicator and many appliances for the engine room.

The Sperry Gyroscope Co., Ltd., London, showed a new two-unit gyro pilot with a separate contact unit which is on the bridge and the power unit connected direct to the throttle on the steering engine. A working model of the Sperry gyro ship stabilizer also was displayed. S. G. Brown, Ltd., North Acton, London, had a gyro compass of British design, with liquid control and three separate and distinct types of repeaters. By a patented device the steering repeater magnifies any movement of the ship four times. Indicating and recording instruments were

displayed by Negretti and Zambra, London.

A very complete exhibit was that of Siemens Brothers & Co., Ltd., Woolwich, who showed electrically controlled ship's telegraphs, revolution indicators, helm indicators, a look-out transmitter whereby the look-out man on the vessel can signal to the bridge the position of any object he observes, navigation lights indicators, torsionmeters of the Hopkinson-Thring type and of the Ford type, loud-speaking telephones and wireless apparatus. The Cambridge Instrument Co., Ltd., London, showed among other exhibits a newly developed combined electrical CO 2 and CO apparatus, metal cased recorders giving six separate records on one chart, electrical distance thermometer outfits, the "Easy-to-read" dial thermometers, and automatic temperature regulators. This firm has an affiliated American company at 3512 Grand Central Terminal, New York City. Henry Hughes & Son, Ltd., London, displayed the echo sounding apparatus. British admiralty patent, the dead beat compass, and sextants, ships' clocks, binoculars and telescopes. Richard Klinger, Ltd., London, showed several of their patent features including a self-aligning reflex water gage, seatless valves, gage tightening cocks for high pressure, and a continuous sight feed lubricating pump. The Marconi International Marine Communication Co., Ltd., showed several sets of wireless apparatus for use on board ship.

Various other classes of exhibits included trucks and electric tipping wagons for dock purposes, paints and painting equipment, welding and metal-cutting apparatus, pneumatic and electric tools for scaling and other purposes, electrical machinery and accessories, lighting plants, special metal bearings, packing, castings of steel, iron and nonferrous metals, beds and cabin fittings.

charge through a pipe line one and one-half miles from the ship's side. Power for all machinery for loading, unloading and propulsion is electric.

When completed this ship will be the most powerful, the largest and undoubtedly, the best and most modern vessel of its class in the world. It is understood that the cost of the SANDMASTER ready to load sand will be nearly \$1,000,000. A detailed description fully illustrated, will appear in a later issue of MARINE REVIEW, after the vessel has been fully completed.

Self-Unloading Barge

Conversion of the 7000 tons steel barge CONSTITUTION, owned by the Pringle Barge Line Co., Cleveland, into a self-unloading conveyor vessel, not self-propelled but equipped with diesel electric power, is under way at the Kraft Shipyard & Drydock Co., South Chicago. The installation is a new design invented and patented by J. A. Sensibar, president of the Construction Materials Co., Chicago.

Expectations are that this job will be completed in time for the opening of navigation in 1926. The vessel is to have a 130-foot outboard conveyor boom with a capacity of 1000 tons per hour for coal, gravel, stone, grain and other bulk freight. Power will be furnished by two diesel electric generating units. It is hoped that later on when nearing completion, an illustrated description of this interesting job can be published.

Freighter To Be Launched

The American Shipbuilding Co., Lorain, expects to launch the first of the two 600-foot steamers building for the Inter-Lake Steamship Co., on Saturday, Jan. 16. This vessel will be christened in honor of Col. James Pickands. The second steamer named for Samuel Mather it is expected will be launched Jan. 30.

Named Superintendent

Isaac De Young has been appointed superintendent of the United States canal at the Soo, succeeding L. C. Sabin who was recently elected vice president of the Lake Carriers. Mr. De Young assisted Mr. Sabin for a number of years and has been connected with the engineering office at the Soo since 1901.

Callaghan Shipping Co., Inc., steamship and chartering agents, 17 Battery place, have succeeded to the business formerly operated by Callaghan, Atkinson Co., Inc.

Diesel-Electric Applied To Dredge and Barge on Great Lakes

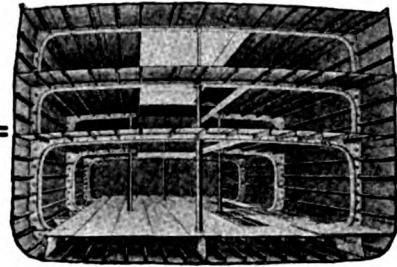
AN interesting and unusual craft, the diesel electric twin screw, self-propelled, sea-going hopper dredge SANDMASTER owned by the Construction Materials Co., Chicago, nearing completion by the Interlake Engineering Co., Cleveland, went into drydock at the American Shipbuilding Co.'s Cleveland plant during the last

two weeks of December to have bossing, struts, two propellers and rudder fitted and installed.

This vessel has been converted from a lake type of ocean cargo ship. She will carry 3000 tons of sand and will be equipped for self loading and self unloading at the rate of 2000 tons per hour and it will be possible to dis-

ISHERWOOD SYSTEM

of Ship Construction



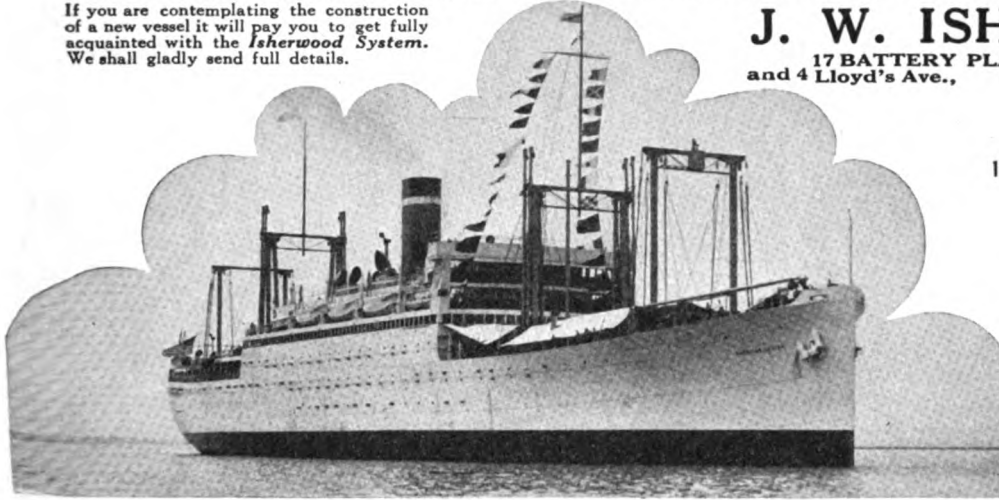
greatly increases longitudinal strength, requires less weight of steel, provides additional dead-weight carrying capacity, reduces collision damages to a minimum, gives greater facilities for making damage repairs, enables you to build thirteen ships out of the weight of steel ordinarily required for twelve vessels, and each ship will carry 2 per cent more cargo!

The Isherwood System has established World records in rapid construction.

If you are contemplating the construction of a new vessel it will pay you to get fully acquainted with the *Isherwood System*. We shall gladly send full details.

J. W. ISHERWOOD

17 BATTERY PLACE, NEW YORK
and 4 Lloyd's Ave., London E. C. 3.



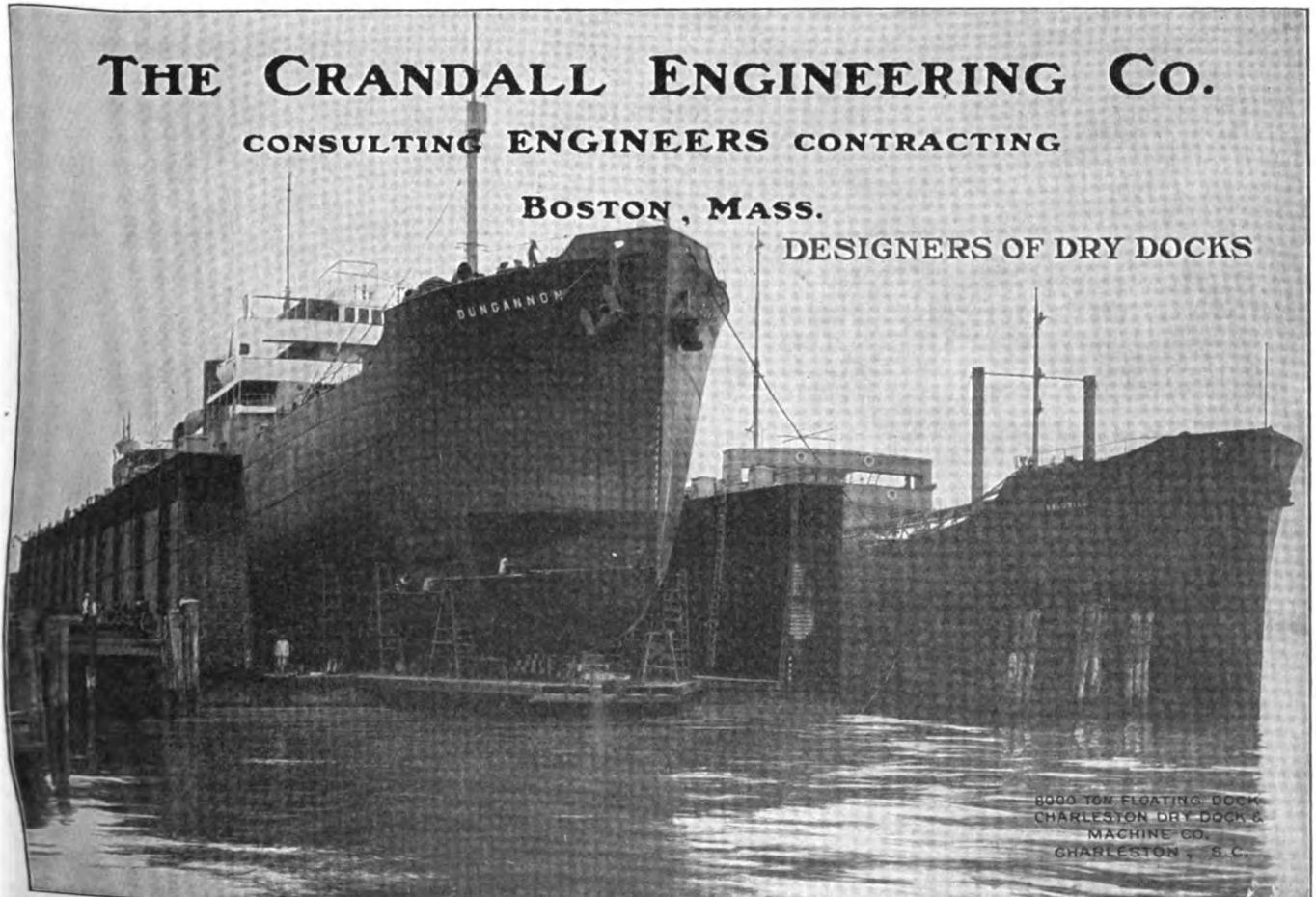
16—535' Passenger Liners
for United States Shipping Board. Built by the New York Shipbuilding Corporation, Bethlehem Shipbuilding Corporation, Ltd., Newport News Shipbuilding and Dry Dock Company.

THE CRANDALL ENGINEERING CO.

CONSULTING ENGINEERS CONTRACTING

BOSTON, MASS.

DESIGNERS OF DRY DOCKS



8000 TON FLOATING DOCK
CHARLESTON DRY DOCK &
MACHINE CO.
CHARLESTON, S. C.

Please mention MARINE REVIEW when writing to Advertisers

Rotary Pump Efficient

(Continued from Page 29)

design that attains static and dynamic balance. For if there is such balance, the design must be symmetrical, and this implies working in either direc-

with the user. Again it must be said that compromise breeds disaster.

A suction lift of 20 feet or more (primed) is highly desirable. There can be no question on that score. And the ability of a pump to give several years of efficient service under

the American Machine & Foundry Co. As a result, this pump approaches more nearly the theoretical ideal than any hitherto built. In a spirit of "no compromise" difficulties of design and construction have been overcome to such a degree that the commercial

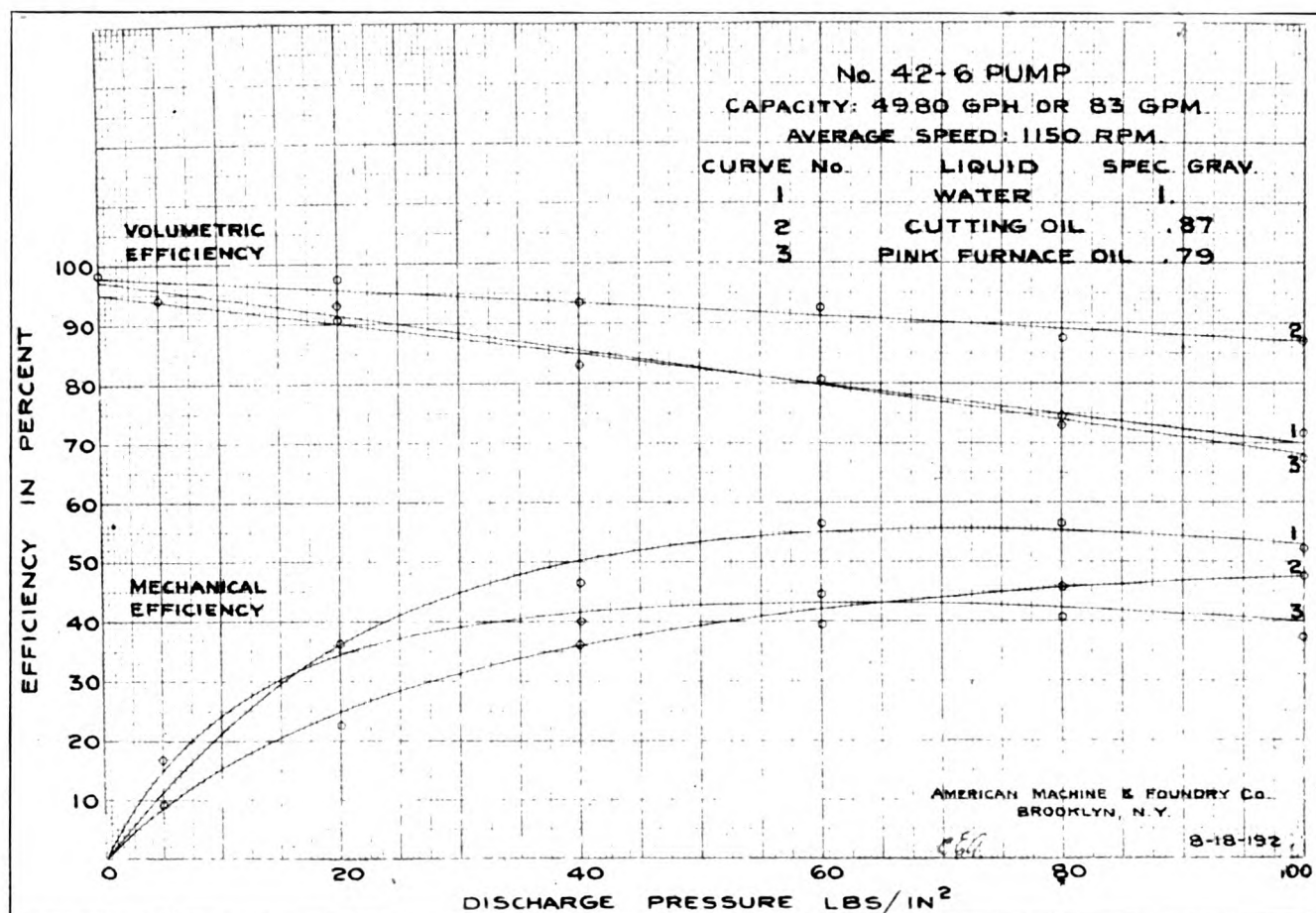


FIG. 3—CHART GIVING THE EFFICIENCIES FOR A 2½-INCH, 83-GALLON-PER-MINUTE ROTARY PUMP—TAKEN FROM 500 HOURS CONTINUOUS RUN FOR EACH LIQUID

tion. The economic advantage, of course, is in the avoidance of construction of right hand and left hand pumps; the one pump being suited for every type of installation.

The need of freedom from internal lubrication finds its application in potable water, or of liquid foodstuffs other than edible oils. A rotary pump having internal bearings or moving parts must be oiled to stand up under operation at 1800 revolutions per minute. But the introduction of lubricating oil into potable water is highly objectionable. Hence internal moving parts must be dispensed with, or so designed as to require no oil. The so-called "oilless" metallic bearings will not withstand service at any such speed as 1800 revolutions per minute.

Freedom from packing trouble is a sore point with practically every rotary pump manufacturer. This is the primary source of dissatisfaction

severe operating conditions is a qualification every user should demand.

All these considerations were held constantly in mind during several years of development work on a new and highly original rotary pump at

possibilities of the new pump are most attractive.

The design of this pump is shown in Fig. 2. The rotor is a plain drum, like the armature of a motor. Upon

(Continued on Page 64)

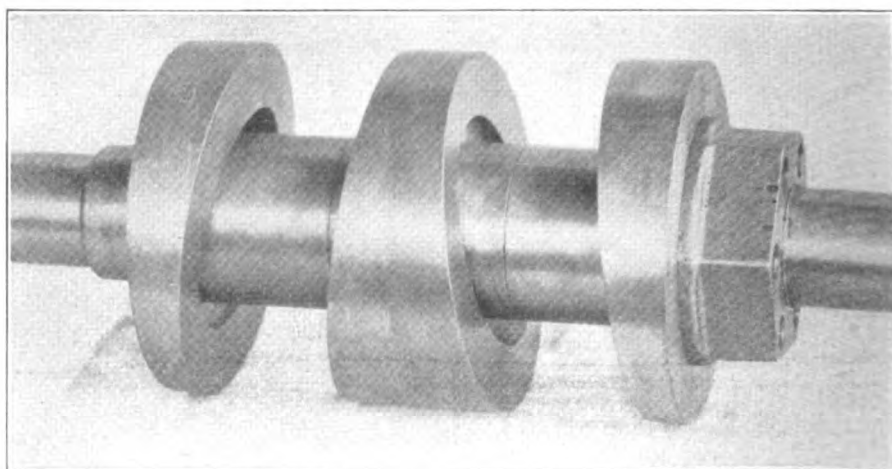


FIG. 4—QUADRUPLE ARRANGEMENT OF CAMS ON SHAFT OF NEW ROTARY PUMP

The design of the L. D. Smith Patented Self-unloader permits converting the standard bulk freighter to perform the following services

1. Unload coal, sand, stone, and other dry, free flowing materials from five hundred to one thousand tons per hour.
2. Will unload large open hearth stone for chemical trades or breakwater construction.
3. Permits loading sand and gravel with centrifugal pumps and unloading dry directly on the dock.
4. Permits loading sand with pumps and unloading with same pumps for hydraulic filling purposes.

We specialize in the conversion of bulk freight ships into self-unloaders for special trades.



Let us figure on your hull and machinery repairs by contract or attractive day rates. Sturgeon Bay harbor offers ideal winter berthing.

Str. "Lakewood" Sand Sucker unloads wet or dry

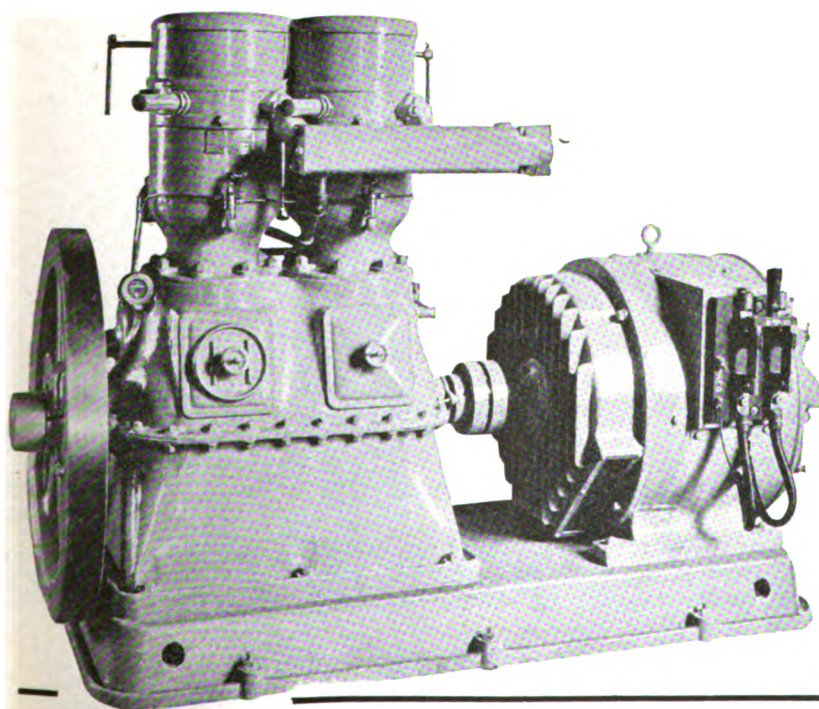
Str. "Fontana" 6000 ton converted unloader

Str. "Lake Markham" hydraulic fill boat

Leathem D. Smith Dock Co.

Sturgeon Bay, Wisconsin

DIEHL



"DIEHL" marine type, enclosed, self-ventilated, ball bearing Generator with special mica insulation, 8 KW, 32 V., driven by Diesel engine. For installation on U. S. Coast Guard boats.

**DIEHL
Manufacturing
Company**

Elizabeth, N. J., U. S. A.

Please mention MARINE REVIEW when writing to Advertisers

General Electric Men

(Continued from Page 35)

Stanford university in 1896 with the A. B. degree. In the following year he entered the employ of the Stanley Electric Mfg. Co., which in 1903 was bought by the General Electric



GEORGE P. BALDWIN, RECENTLY ELECTED VICE PRESIDENT GENERAL ELECTRIC CO., WITH HEADQUARTERS AT 120 BROADWAY, NEW YORK CITY

Co. At that time, Mr. Baldwin became vice president of the Blaisdell Co., Los Angeles, where he remained until March 16, 1910, when he was



CHARLES E. PATTERSON, VICE PRESIDENT OF THE GENERAL ELECTRIC CO., RECENTLY PLACED IN CHARGE OF ALL MERCHANDISING ACTIVITIES, WITH HEADQUARTERS IN BRIDGEPORT, CONN.

made manager of the Pittsburgh office of the General Electric Co. On Dec. 16, 1915, he was made manager of the Atlantic district with headquarters in Philadelphia. When the merchandising department was created in 1923, he was made its first manager.

Mr. Patterson is a native of New York City, born in April, 1866. He entered Princeton university with the class of 1886 but, because of the death of his father, his course was interrupted and he went to work. He secured a position in New York where he was able to continue his studies. Later he secured a position with the New York Central and, by crowding his work into three and one half days and many nights and spending the other two and one half days each week at Princeton, he secured his degree in 1901. At this time, he had risen in the ranks of the New York Central to assistant comptroller. On the day he received his diploma from college he was elected comptroller of the American Locomotive Co. After eight years with this company he became associated with the General Electric Co. and in 1913, when R. E. Steele died, he was elected comptroller, a position he held until Sept. 10, 1920, when he was elected a vice president of the company.

J. W. Owens Appointed Director of Welding

James W. Owens, the navy's authority on welding, will become affiliated with the Newport News Shipbuilding and Dry Dock Co. on January 1, as their director of welding. Mr. Owens became associated with the welding committee of the Emergency Fleet Corp. in April, 1918, and in September, 1918, received a special appointment at the Norfolk yard as welding aide. He organized the first welding shop in the navy, trained a large number of welders, has conducted many fundamental researches in welding and is the author of a book *Fundamentals of Welding*. Admiral David W. Taylor C. C., U. S. navy, retired, in a foreword to this work says: "It is due largely to his research and investigation that today we make such liberal use of welding on naval vessels. Mr. Owens has gone far to reduce an art—an art of many obscurities and perplexities—to a science, so that the engineer can proceed with confidence to make appropriate use of the recent developments in the art of uniting materials by welding."

At the Newport News Shipyard, Mr. Owens will have responsible charge of

all welding development. Mr. Homer L. Ferguson, the president of the company, has decided to extend the use of welding to all classes of work undertaken by his company in the future. Mr. Owens was one of the



JAMES W. OWENS
Becomes Director of Welding at Newport News, S. B. & D. D. Co.

organizers of the American Welding society, is a former vice president of the society and a member of the American Institute of Electrical Engineers.

Coulby Elected President of Interlake S. S. Co.



HARRY COULBY
Elected President of the Interlake Steamship Co.—To take office Jan. 1

MARINE DEPARTMENT

of

American Bridge Company

FRICK BUILDING

PITTSBURGH, PENNA.

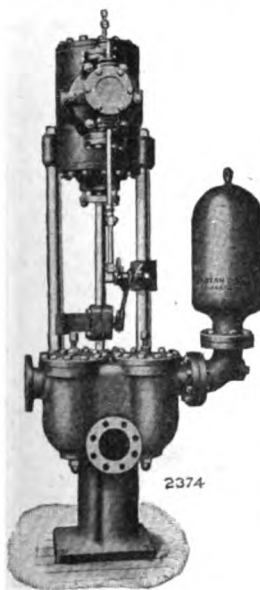
BUILDERS OF

STEEL BARGES

for RIVERS and HARBORS

CAR-FLOATS

DEAN BROS.



Feed Pump

Atlantic Type Boiler Feeder. This pump has proved very satisfactory for Marine Service. The stroke is long which reduces the wear on all moving parts. The valve movement is easily adjustable. The pump can be operated for long periods without overhauling.

DEAN BROS. CO. INDIANAPOLIS.

 323 W. 10TH ST.
ESTABLISHED 1869

STATEN ISLAND SHIPBUILDING COMPANY

STATEN ISLAND, NEW YORK

 SHIP & ENGINE BUILDING
 DRY DOCKING & REPAIRS
 BRASS & IRON FOUNDRIES

 DRY DOCKING CAPACITY
 UP TO 10,000 TONS

 New York Office: 1 Broadway
 MAIN OFFICE & PLANT: MARINERS HARBOR, S.I.

Please mention MARINE REVIEW when writing to Advertisers

Rotary Pump Efficient

(Continued from Page 60)

the surface of this drum is cut a wide, but shallow, helical groove, across which lies a dam, or vane. This vane is short, light and rectangular in shape, and may be made of metal or lignum vitae.

This vane reciprocates positively under the camming action of the

both statically and dynamically.

The pump shaft is packed with an improved form of stuffing box at the inboard end, and an oilless blind bearing is used on the outboard end for small, fractional horsepower pumps. On larger pumps, both ends of the shaft are packed. The shaft bearing is of the ring oiler type and is outboard of the packing and packing gland. The gland can be removed

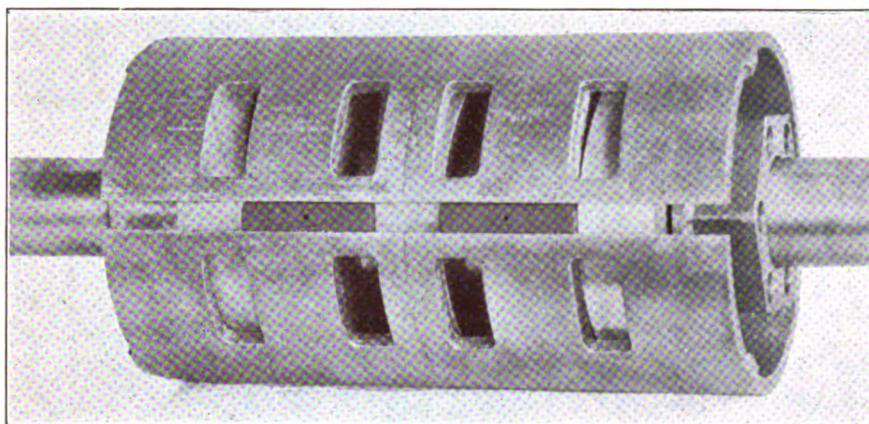


FIG. 5—LINER KEYED TO HOUSING IN QUADRUPLE ARRANGEMENT OF CAMS ON NEW ROTARY PUMP—OPENINGS SHOWN ARE INLET AND OUTLET PORTS

helical groove in the drum. The drum rotates, but the vane is restrained from rotating by the fact that it is assembled through a slot in a dia-

and new packing inserted without disturbing the oilbearing.

Ports of the pump are symmetrically spaced with respect to the vane, and the pump may consequently be operated equally well in either direction of rotation with no physical change. The vane engages in the cam groove at the upper element of the main drum, and in the larger sizes is accessible through a hand hole plate.

In the chart marked Fig. 3, is given the volumetric and mechanical efficiencies for this pump at 1150 revolutions per minute over a range of discharge pressures from zero to 60 pounds per square inch, pumping water. The tests were conducted on a brand new pump over a period of 500 hours continuous run for each liquid. A general view of the new 2½ inches, 83 gallons per minute rotary pump, direct connected to a commercial high speed motor is shown in Fig. 1, while Fig. 4 shows in detail the quadruple arrangement of the cams on the shaft, and Fig. 5 the liner keyed to the housing. The openings in the liner are inlet and outlet ports and the reciprocating vanes are shown in place.

For many years engineers have been wont to give little respect to rotary pumps except in limited applications; but the American Machine & Foundry rotary pump bids fair to compete efficiently in many lines hitherto closed to this general type.

Moore Yard Low Bidder for Key Ferries

The Moore Dry Dock Co. with a bid of \$1,659,703 proved to be the low bidder on the two new double ended, all steel, turbo-electric ferry boats for the Key System Transit Co. Five shipyards in and about San Francisco submitted tenders to McCauley, Hibbs and Smith, naval architects and marine engineers of San Francisco, designers of the vessels.

The vessels will be 276 feet in length over all and 47 feet molded beam, and beam over the guards, 70 feet, and molded depth, 21 feet. A list of all bids received follows: General Engineering & Drydock Co., \$1,927,594, eleven and twelve months; Bethlehem Shipbuilding Corp., \$1,732,369, ten and eleven months; Pacific Coast Engineering Co., \$1,879,996, twelve and thirteen months; Hanlon Drydock & Shipbuilding Co., \$1,792,576.

Baker Becomes Counsel for Lake Carriers

In the choice of Newton D. Baker as general counsel to succeed Harvey D. Goulder resigned, the Lake Carriers' association demonstrated its ability to pick a leader for this important office of tried and known cali-



P. V. G. MITCHELL, RECENTLY APPOINTED VICE PRESIDENT OF THE INTERNATIONAL MERCANTILE MARINE CO.—HE WAS FORMERLY RESIDENT DIRECTOR OF THE RED STAR LINE OF THE I. M. M. CO. IN ANTWERP

phragm which is either a part of, or rigidly connected to, the pump housing. Mounted concentrically in the drum housing and on the drum shaft, the drum is thus naturally balanced



NEWTON D. BAKER
Succeeds Harvey D. Goulder as General Counsel of the Lake Carriers' association

bre. It would be difficult to think of another man acquainted with Great Lakes affairs, the equal of Mr. Baker, as a brilliant lawyer, a great public speaker and a national figure of prominence. He was elected to the office of general counsel on Dec. 1, 1925.